COMPETITIVENESS FACTORS FOR ATTRACTING AND MAINTAINING AUTOMOTIVE INVESTMENT: COMPARISON BETWEEN CANADA AND MEXICO

Prepared for:
INDUSTRY CANADA
AND
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EXECUTIVE SUMMARY

CURRENT INVESTMENT CLIMATE

Recent economic expansion in North America has led to unprecedented economic activity in the Canadian and Mexican automotive industries. At the same time, there is little doubt that relative to Mexico, Canada is a mature market with stable growth prospects. Mexico, in contrast, has the potential for considerable investment growth in the automotive industry. This report examines why automotive companies are investing in Mexico as well as the current and potential future threat Mexico represents for the Canadian automotive. We also discuss the strategic policy implications for Canadian governments in their efforts to grow the automotive sector in Canada.

While the growth prospects for the Mexican automotive sector may be larger relative to Canada's growth prospects, it is important to bear in mind the considerable size disparity in the two countries' automotive sectors. Canada's automotive sector is twice the size of Mexico's currently. In 1999, the value of assembly shipments in Canada was $76.4 billion compared to $34.0 billion in Mexico [note that all dollar amounts are expressed in Canadian currency unless otherwise explicitly indicated]. The situation is similar for automotive parts, with shipments in Canada valued at $33.3 billion compared to $17.1 billion in Mexico. These differences are similarly reflected in production levels. In 1999, Canadian plants produced approximately 3.0 million vehicles while Mexico produced 1.5 million vehicles.

While Canada is a much larger market for automotive production than Mexico, recent growth in Mexico is higher than growth in Canada. Between 1993 and 1999, Canadian light vehicle production grew at an annual compounded rate of 5.0% while in Mexico annual compounded growth was 6.0%.

So while Canada's share of the North American assembly market is double that of Mexico, Mexico is gaining some ground. Thus, we find that since 1979, DaimlerChrysler, Ford and General Motors have closed 49 plants in North America, while opening 31 new ones. In this process, Canada has gained one plant on balance while Mexico has gained eight new plants. Canada has also seen a much lower level of automotive investment under NAFTA than Mexico. While Canada attracted investment of $22.1 billion in automotive machinery, equipment and construction from 1994 to 1999, including both foreign and domestic spending, Mexico attracted $47.7 billion in foreign investment alone.[1]

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[1] The investment number for Canada is calculated based on the Ontario figure, which was $21.4 billion. In 1999, Ontario automotive shipments represented 97% of Canadian automotive shipments.

Competitiveness Factors for Attracting and Maintaining Automotive Support: Comparison Between Canada and Mexico

The appeal of Mexico as an automotive investment location is largely attributable to the following factors:

- Low wages;
- Highly productive and flexible workforce;
- Rapidly growing domestic market;
- Geographic proximity to the southwestern U.S.; and,
- Access via free trade agreements to markets in North America, South America, and Europe.

While we explore a broad spectrum of macro-economic, government policy and social factors that might determine investment activity in the automotive sector, we find that the overriding factor of importance is labour cost. As expected, wages and benefits are much lower in Mexico than in Canada, with a total compensation package (salary plus all mandated benefits) in assembly costing approximately 25% the amount paid in Canada.[2]

Interestingly we find that low cost labour does not come at the expense of low productivity. At first blush this conclusion appears to contradict productivity statistics. However, while Canadian automotive plants are generally in the upper half of North American plants in terms of various measures of productivity and Mexican plants are generally near the bottom by such measures, it would be a mistake to draw from this that Mexican labour is inherently less productive than Canadian labour. The lower productivity seen in Mexican plants is the result of two factors: first, the relatively small scale of certain Mexican plants; and second, the deliberate choice of manufacturers to take advantage of lower Mexican labour costs by substituting labour for capital. In many areas, Mexican plants utilise simpler and more flexible low cost assembly lines with below-average levels of automation rather than the more highly automated systems commonly seen in Canada and the U.S. Industry figures consistently report that *when given the same levels of capital*, Mexican labour is at least as productive as Canadian labour.

As noted above domestic demand in Mexico for vehicles is growing considerably, making it an appealing market for original equipment manufacturers (OEMs). Currently, about 25% of OEM production in Mexico is consumed in-country and, given Mexico's strong economic performance since 1994 together with indications of pent-up consumer demand, OEMs expect Mexican demand for cars will continue to grow.

As these statistics indicate, most Mexican production is exported. Thus, Mexico's free trade agreement with the European Union (EU), the network of other free trade agreements that it is building throughout the Americas, and the potential for a trade agreement with Japan are all stimulants to further investment activity. Mexico is seen as an emerging trade hub between the EU, NAFTA, and major Latin American markets, and may attract a substantial share of North American investment from European (and potentially Asian) companies seeking a low-cost, duty-free site for serving markets throughout the world.

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[2] While differences in data collection methodology in Mexico and Canada do not allow a perfect comparison between Mexican and Canadian automotive salaries, using published data from INEGI and Statistics Canada together with information on mandated benefits, the ratio of Mexican labour costs as a percentage of Canadian labour costs for assembly is 26%, while for parts manufacturing the ratio is 17%. This is in keeping with the information cited by industry representatives who noted that hourly labour costs (salary plus benefits) tended to be $10 in Mexico compared to $40 in Canada (see Section 3 for further details).

Weighed against these advantages are certain disadvantages of producing in Mexico, which we find are gradually becoming less important over time. Historically, Mexico's distance from core North American markets and the comparatively poor quality of Mexican transportation infrastructure resulted in high outbound freight costs for exported vehicles. In recent years, this has been mitigated by several factors, including the growth in Mexican demand for vehicles, OEM choices to produce vehicles (particularly sport utility vehicles (SUVs) and pickup trucks) in Mexico that are in high demand in the nearby southwestern U.S., and, improvements in Mexican transportation infrastructure. The lack of a world-class supply base for many automotive components also has hindered the growth of Mexican production, resulting in high inbound freight costs when parts must be obtained from outside Mexico. However, the opening of the Mexican market to foreign-based component suppliers and their willingness to produce locally for Mexican assemblers is increasingly reducing these costs.

Apart from labour costs, most costs associated with Mexican production are broadly comparable to those in Canada when examined collectively, even though some costs will be higher in certain regions. Overall, these differences tend to be relatively minor and cancel each other out. Nonetheless, it is the case that Mexican land costs vary considerably from region to region and are in some cases higher or comparable to those in Canada. Standards with respect to environmental regulations specific to the automotive sector are now largely comparable between Canada and Mexico, as are company standards with respect to safeguarding worker health and safety in either country. Other costs related to infrastructure, utilities, corporate taxes and administration are, in varying degrees, often higher in Mexico, with the largest differences occurring in infrastructure, utilities and administration. However, none of the areas in which Mexican costs exceed those in Canada prove to be sufficiently higher in Mexico to outweigh the benefits of investing in Mexico (with the occasional exception of administrative costs). Industry participants indicate that returns on investment in Mexico are at least as high as in Canada or higher, in some instances 2-3 times higher.

In terms of macroeconomic factors, there is little doubt that Canada is a much richer and more stable nation than Mexico. Nonetheless, Mexico has advanced considerably in recent years in terms of improved stability, greater openness to trade and improved investment conditions generally.

The greatest difference between the two countries' government policies is with respect to labour and employment. The Mexican government takes a much more active role in labour laws that govern the relationship between employer and employee, frequently mandating the use of unions. As a result, unions are far more widespread in Mexico than in Canada (the rate of unionisation in the Mexican automotive sector is almost 100%, while in Canada it is about 60% for the sector as a whole). Notwithstanding higher unionisation in Mexico, there are far fewer strikes in Mexico relative to Canada. Turnover tends not to be a problem in either Canada or Mexico for the type of automotive manufacturing that is carried out in both countries, i.e. vehicle assembly and sophisticated parts manufacturing, sectors in which Mexican producers usually offer comparatively generous compensation packages. Where turnover has been an issue, this is typically in lower wage sectors of Mexico with very labour-intensive parts production, an area of the industry in which Canada has a minimal presence.

Another government policy difference is in the area of research and development (R&D). Canada has far greater expenditures on R&D as a percentage of GDP, about three times that of Mexico in 1999. Canada also has one of the most generous tax treatments of R&D in the world, as well as a host of other government programs designed to encourage R&D. Despite this, neither the Canadian or Mexican automotive sectors are characterised by high rates of R&D expenditures generally.

FUTURE PROSPECTS

Whether in Canada or Mexico, future growth in assembly will be constrained by the existence of substantial excess capacity throughout North America and the world. While any company in need of additional capacity to serve the North American market is likely to find Mexico to be a highly desirable location in which to establish a new facility, firms with excess capacity are highly unlikely to be replacing existing facilities with new production in Mexico. A large amount of capital is required to establish new plants and the cost of the guarantees that U.S.-based OEMs have made to their U.S. and Canadian workers mean that the economics of shutting down plants in the U.S. or Canada and replacing such facilities with a new plant in Mexico generally are not favourable.

On the whole, North America is far likelier to see more plant closings than plant openings over the next decade as manufacturers seek to rationalise production within their existing facilities. As capacity is rationalised, those plants in Canada and in Mexico that will require major levels of investment to remain viable producers of high quality vehicles are extremely vulnerable.

On balance, the remaining Canadian assembly plants are likely to be relatively unaffected by capacity rationalisation as they offer their owners a combination of high efficiency, high quality, and low (by U.S. standards) labour costs. Moreover, Canadian plants produce a product mix heavily weighted towards "core products" such as midsize to large cars, pickup trucks, and vans for which, barring severe energy shocks, demand is likely to remain relatively stable. In addition, where strategic capacity expansions are required to meet demands for new products, Canada will likely remain a viable choice for new investment, as recent decisions by Toyota to produce Lexus SUVs at Cambridge, Ontario and by Honda to establish minivan production at Alliston, Ontario illustrate.

While not necessarily at the expense of plant closings in Canada, Mexico is likely to gain assembly capacity even as capacity throughout North America is rationalised. Given overall labour costs, the growth of the Mexican vehicle market, and the emergence of Mexico as a potential free trade hub, Mexico is likely to attract a disproportionate share of any new investment needed to rationalise North American production capacity in fewer plants. The capacity of several Mexican plants has recently been expanded and can continue to be expanded through strategic investments in "debottlenecking." In addition, lower labour costs and the opportunity to establish flexible work arrangements make Mexico an ideal spot in which to produce "niche market" vehicles that cannot justify a dedicated full-scale assembly plant.

With respect to automotive parts, Mexico's competitive strengths in international trade lie with those parts using high labour content, particularly parts that are not required on a just-in-time basis. These include parts such as seat belts, seat covers and the final assembly of automotive electrical and electronics components. Mexico's competitive weaknesses have been capital-intensive parts, again particularly those that are relatively hard to ship, or those that are required on a just-in-time basis. Such parts include some body parts as well as most production equipment.

While the trade statistics confirm the general picture that exports of labour-intensive goods prevailed over 1996-2000, they do not reveal an underlying trend in exports. To date, while there continues to be a large percentage of parts that are imported as the volume of demand for some of these inputs has not been sufficiently high to justify investment in Mexico, this is changing with increased OEM production in Mexico, the increase in the length of Mexican product runs, and the liberalisation of the Mexican parts industry. The most economical way for global parts suppliers to meet the needs of Mexico's assembly plants is to establish production facilities in Mexico close to OEMs who require just-in-time delivery. For the most part, these particular parts facilities export little. Moreover, if it were economical to transport these parts long distances, potential suppliers would have seen little need to go to Mexico in the first place.

POLICY IMPLICATIONS

The growth of the Mexican automotive industry should not be disastrous for the Canadian automotive sector. This is particularly clear for assembly. While we expect production of vehicles in Mexico to continue to increase over the next decade, we do not expect that any such increase will come at the expense of particular Canadian production. Domestic demand growth in the Mexican market should be sufficient to absorb any increase in overall North American capacity arising from the marginal additions to Mexican capacity that OEMs can be expected to make. Given the high degree of sunk capital investments in existing U.S. and Canadian facilities, as well as the costs of labour guarantees, it makes little sense for manufacturers to open Mexican plants solely for the purpose of replacing existing capacity elsewhere in North America. As some existing capacity in North America is rationalised, Canada should fare reasonably well as a source of production. Labour costs at Canadian plants compare very favourably with those in the U.S., as do the records of Canadian plants for high productivity and high quality.

Much of the growth of the Mexican parts sector has been, and will continue to be, motivated by the growth and rationalisation of the Mexican assembly industry. As parts production expands in Mexico, this may represent lost potential export markets for Canada. Another source of growth in Mexican parts production has been the growth of an export-oriented parts sector focused on labour-intensive parts and production processes. The expansion of this sector, and the post-liberalisation emergence of a more competitive domestic parts sector in Mexico, does potentially threaten component production in the U.S. and Canada. However, it also creates opportunities as well, as Mexico becomes ever more fully integrated into the North American automotive components value chain, opportunities arise for Canadian producers to specialise in more capital and material intensive production processes, while leaving the most labour intensive activities to be done in Mexico.

With respect to government policy, it is important for government authorities to remember that even with the growth of Mexican assembly activity, the main locus of North American automotive production will continue to reside along the Highway 401 / Highway I-75 corridor linking Toronto and the U.S. Midwest and Southeast. Given this, a potential role for Canadian government policy is to undertake policies that promote innovation. It is clear that Canada cannot compete with Mexico for very labour-intensive production in mature parts production technologies, but there may be opportunities for Canada in pioneering new parts and manufacturing technologies. Innovation not only brings the rewards of direct returns to the innovator in the form of manufacturing profits and technology royalties, but it may also open opportunities for Canadian production workers. The challenge, however, to the innovating country is to hold on to production once a technology matures. In the long run, competition and the profit motive will lead production jobs to migrate to the lowest cost production locations, irrespective of the country that pioneered the innovation. A focus on developing new technologies that are complementary to Canada's other areas of competitive strength may help alleviate this problem.

Second, while Canada clearly would not be the preferred location for investments in sectors dominated by low labour costs alone, free trade access to European, South American, and other markets could potentially attract some investments that would otherwise go to Mexico or, especially, to the U.S. Given the current U.S. political climate, in which the U.S. Congress is reluctant to give the U.S. President the "fast track" authority needed to negotiate broad trade agreements, Canada may have an opportunity to leap-frog the U.S. in trade access, making it a still more attractive country into which to invest.

The remainder of this report is structured as follows:

Section 1. This section provides an overview of the automotive sectors in Canada and Mexico, and their recent performance.

Section 2. This section compares the economic environments for investment in Canada and Mexico, including information on government programs.

Section 3. This section evaluates competitiveness in a number of automotive sub-sectors, and suggests future trends for production and investment.

Section 4. This section illustrates the findings of the information collected through interviews.

Section 5. This section summarizes the investment climate for Canadian and Mexican automotive companies, and provides comment on strategic policy implications for Canadian governments.

1. OVERVIEW OF THE CANADIAN AND MEXICAN AUTOMOTIVE SECTORS

In this section of the report, we present an overview of the Canadian and Mexican automotive sectors. We begin with discussion of the historical development of each country's automotive industry. This is followed by a discussion of the role that the automotive sector plays within each country's domestic economy. For this, we report on output, employment, production, and domestic sales. Next we turn to the importance of each country within the North American automotive sector, reporting on share of North American production and trade activity.

The automotive sector is considerably larger in Canada than in Mexico for both assembly and parts.[3] In 1999, the value of assembly shipments in Canada was $76.4 billion[4] having grown from $60.3 billion in 1998.[5] In Mexico, the value of assembly shipments was $34.0 billion in 1999 having grown from $29.1 billion in 1998. The value of auto parts shipments in Canada was similarly greater than that in Mexico. In 1999, the value of automotive parts shipments in Canada was $33.1 billion while Mexico sold $17.1 billion worth of automotive parts.[6] As these shipment numbers indicate, Canada's 15 light-duty vehicle assembly plants lead Mexico's 12 light-duty vehicle assembly plants in production. In 1999, Canadian plants produced approximately 3.0 million vehicles while Mexico produced 1.5 million.

Both countries have experienced strong growth in the automotive sector over recent years. Between 1993 and 1999, Canadian light vehicle production grew 34.3%, or an annual compounded rate of 5.0%. Mexican growth in production between 1993 and 1999 was 41.6%, or an annual compounded rate of 6.0%.

Historical Development of the Automotive Industry

Canada

Historically, Canada relied on import tariffs to support growth in the automotive sector. Over time, these tariffs have been reduced considerably, such that today Canada is characterized as an open economy.

The foundation of Canada's automotive industry is the Canada-United States Automotive Products Trade Agreement, or Auto Pact, which was established in 1965 and integrated the automotive markets in Canada and the U.S. Under the Auto Pact, Canada provided specified vehicle manufacturers with duty relief in exchange for maintaining a Canadian production to sales ratio. It is often argued that for most established manufacturers the Auto Pact was non-binding, since manufacturers routinely exceeded production to sales ratios by a significant margin.[7] For manufacturers not yet located in Canada, however, the Auto Pact acted as a strong incentive to begin production in Canada to save on tariffs. In order to extend the Auto Pact to new manufacturers, from 1975 to 1989, the government managed a system of special remission orders applying duty reductions to manufacturers not covered under the original agreements.

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[3] In terms of its value within the economy overall, the Canadian automotive industry contributed 2.53% to total Canadian GDP in 1999 and the Mexican automotive industry contributed 2.82% to total Mexican GDP in that same year.

[4] Electronic data by Statistics Canada. The following NAICS categories make up the $76.4 billion worth of shipments: Motor Vehicle Manufacturing, Motor Vehicle Body and Trailer Manufacturing.

[5] "Manufacturing Industries of Canada; National and Provincial Areas. 1998." Electronic data by Statistics Canada. The following NAICS categories make up the $60.3 billion worth of shipments: Motor Vehicle Manufacturing, Motor Vehicle Body and Trailer Manufacturing.

[6] Industria Nacional de Autopartes, A. C. (National Civil Association of Automotive Parts Manufacturers), Electronic data by Statistics Canada. The following NAICS categories make up the $33.1 billion worth of shipments: Motor Vehicle Plastic Parts Manufacturing and Motor Vehicle Parts Manufacturing.

In 1989, the Canada-U.S. Free Trade Agreement (FTA) provided for the phasing out of duty remissions, in addition to closing Auto Pact membership (later incorporated into NAFTA). Under the FTA, vehicles and parts were exempt from duty if they met a 50% rule of origin for content. With the transition to NAFTA, vehicles and major parts faced a content requirement of 56.5% commencing in 1998, rising to 62.5% on January 1, 2002. For all other components, the requirement is 55% as of 1998, increasing to 60% in 2002.

In October 1999, the World Trade Organization (WTO) ruled that the Auto Pact constituted a barrier to trade. As a result, Canada has commenced, as of February 2001, phasing out all remaining facets of the Auto Pact. Notwithstanding its initial importance to the industry, the end of the agreement is expected to have little impact on the sector, given the Canadian industry's general competitiveness and favorable access to North American markets through NAFTA.

Going forward, Canada's automotive sector is faced with a new set of challenges, including the globalization of production, supplier and assembler consolidation, and a mature North American market. The competitiveness of Canada's automotive industry relative to other regions, both in the Americas and worldwide, will be a key determinant of Canada's success in adapting to these challenges.

Mexico

While assembly plants have been present in Mexico since the 1930s, beginning in the 1960s the Mexican government began actively promoting the automotive sector in its trade and domestic policy. Early efforts concentrated on advancing import substitution for transmission systems, engines and engine components.

By 1977, a patchwork of policies had developed covering an emerging domestic automotive industry. To respond to the sector's growing importance in foreign exchange and capital account balances, the Mexican government passed the 1977 Auto Decree, which established a comprehensive policy framework for the sector. The 1977 Auto Decree introduced a wide range of new regulations, from foreign ownership restrictions to local content requirements.

A new auto decree was issued in 1989 in an attempt to rationalise the Mexican automotive industry and to promote Mexico's integration within international trade and production systems. In exchange for better access to foreign markets the government liberalized its import regime, which in turn led to a reduction in the number of domestic vehicle models produced. The reduced number of models allowed Mexican plants to specialize in competitively producing particular vehicle models through the achievement of economies of scale.

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[7] At the time of implementation, most manufacturers established in Canada met production to sales ratios, and as a result, the Auto Pact worked to promote this commitment as the auto sector matured.

While the 1989 Auto Decree (1989 Decree) made limited reductions to protectionism in the sector, most foreign investment and local content restrictions were maintained. As with the 1965 Canada-U.S. Auto Pact, the 1989 Decree mandated production to sales ratios for firms, requiring companies to produce in Mexico in order to sell in Mexico. Companies also faced local content requirements and "trade balancing" measures requiring automotive producers to run surpluses. Under the 1989 Decree, Mexican import duties ranged from 10-20% for all products. Despite these restrictions, the 1989 Decree provided a greater degree of access to the Mexican market than had been previously available. The success of the 1989 Decree can be seen in the rapid rise in both imports and exports after 1989.

During the period of the 1989 Decree, the Mexican auto industry enjoyed preferential access to the U.S. market. The Generalised System of Preferences (GSP) eliminated duties on the majority of automotive parts, and reduced duties on passenger cars and light trucks to 2.5%. Duties on pick-ups and larger trucks, however, continued at the level of 25%. Under this tariff regime, Mexican car and light truck production doubled between 1988 and 1992 and exports rose 124%.

Under NAFTA, Mexico has committed to reducing local content requirements from 36% in 1994 to 29% in 2003, with their full elimination set for 2004. Cars and light trucks entering Canada and the U.S. from Mexico currently face tariffs of 2.3% and 1.5%, respectively.

1.1 AUTO SECTOR'S IMPORTANCE WITHIN DOMESTIC ECONOMY

While the size of the automotive sector relative to total GDP within Canada and Mexico is similar, the Canadian automotive sector is considerably larger than that of Mexico, both for assembly and parts. Canada has both a larger number of automotive plants and higher average production at its automotive plants compared to Mexico. This section provides summary information on output, production, domestic sales, and employment, comparing the two countries.

1.1.A Output

In 1999, the value of assembly shipments in Canada was \$76.4 billion in 1999[8] compared to \$34.0 billion in Mexico. The value of auto parts shipments in Canada was also greater, equal to \$33.1 billion in 1999, compared to \$17.1 billion in Mexico.[9]

The assembly of cars and light trucks accounted for 60.4% of the value of shipments in Canada (embodied in the value of shipments from assembly is the value of automotive parts). Motor vehicle parts are the next most important segment accounting for 32.0% of the value of Canadian shipments. The remaining 7.6% is generated by the manufacture of trucks, bus bodies and trailers. This roughly two-thirds/one-third split between the value of motor vehicle assembly shipments and motor vehicle parts shipments has been fairly stable throughout the 1990s. In terms of value-added, the shares of assembly and parts in Canada were roughly equal at 52.3% and 47.7%, respectively in 1998.[10]

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[8] Statistics Canada. The NAICS categories that account for the \$76.4 billion in shipments are as follows: Motor Vehicle Manufacturing, Motor Vehicle Body, and Trailer Manufacturing.

[9] Industria Nacional de Autopartes, A. C. (National Civil Association of Automotive Parts Manufacturers), Electronic data by Statistics Canada.

The breakdown of the total automotive value of shipments into the industry's subcategories (cars, light trucks, parts, heavy duty trucks, buses and trailers) is very similar in Mexico. In Mexico, the assembly of cars and light trucks accounted for 60.8% of the total value of shipments in 1999 (the share was similar in 1998 at 60.0%). Sales of auto parts accounted for 33.5% of total Mexican automotive sales, and heavy trucks, buses and trailers constituted 5.7%.

The automotive sector is of similar importance to both countries with the Canadian automotive industry contributing 2.53% to total Canadian GDP in 1999 and the Mexican automotive industry contributing 2.82% to total Mexican GDP in that same year. In addition, automotive exports in both countries represent a large portion of overall manufacturing and merchandise exports.

1.1.B Production

Canadian Assembly

In Canada, most of the automotive industry is located in Ontario and as such much of the focus of this report is on that province. As noted above, the most important sectors in the Canadian automotive industry are light-duty vehicle assembly and motor vehicle parts production, largely for light-duty vehicles. Heavy-duty trucks, trailers and bus production play a less important role in the Canadian economy compared with light-duty vehicle manufacturing, both in terms of employment and output. This is true for the North American industry as a whole. Moreover, investment activity in the light-duty sector is more dynamic than for heavy-duty vehicle production. Production location and component sourcing decisions are typically made when new product designs are introduced, and product lifecycles for light-duty vehicles are typically considerably shorter than those for heavy-duty vehicles. Because the light-duty sector is much larger and more dynamic, instances of potential competition among Canada, Mexico, and the United States for new automotive investment are far more frequent in the light-duty sector than in the heavy-duty sector. As a result, this report will focus strictly on light-duty vehicle production.

In 1999, Ontario produced just over 2.9 million light-duty vehicles, up from 2.5 million in 1998. Ontario's production accounted for about 97% of light-duty vehicles produced in Canada in 1999. Of the 15 light-duty vehicle assembly plants in Canada, all but one are located in Ontario (General Motors (GM) produces the Camaro and Firebird in Sainte-Thérèse, Quebec).[11] (See Figure 1.1 below for the location of these plants.)

The Big Three (GM, Ford and DaimlerChrysler) accounted for 80.0% of Canadian production and 77.4% of automotive production in Ontario.[12] GM produces the most vehicles in Canada, followed closely by DaimlerChrysler and Ford. Honda is the largest off-shore based producer followed closely by Toyota. Production of light trucks and minivans accounted for just over one-half (53%) of the Big Three's production in Canada (and 54.9% of Big Three's production in Ontario). In fact, eight of Ontario's twelve assembly facilities exclusively produce light-duty trucks or mid-size to large cars, and all of the production by the Big Three, except for the joint venture by GM and Suzuki, is in larger light-duty vehicles.

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[10] Statistics Canada has indicated that data on manufacturing valued added are not available beyond 1998.

[11] Volvo produced its 70 Series in Halifax but shut the plant down in December 1998.

[12] The Big Three percentage share excludes the total sales by CAMI – the joint venture between Suzuki and GM.

The assembly of light-duty vehicles represents the large majority of both the value-added and the value of shipments in the Canadian automotive industry (see Table 1.1 below for production of cars and light-duty trucks by Canadian plant and Figure 1.1 for plant locations).

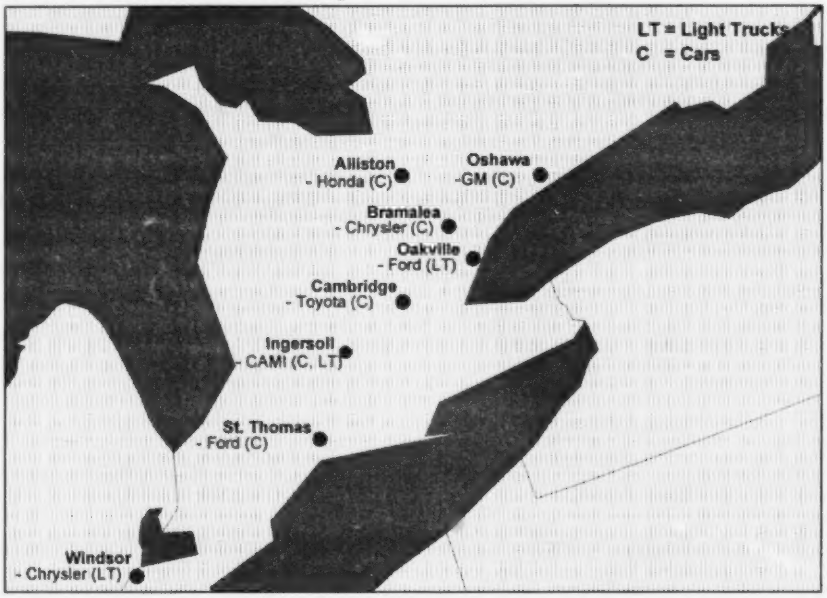
Table 1.1: Automobile and Light Truck Production in Canada

Assembler/Location	Product	1999 Output (Capacity Utilisation)	1999 Employment (# of employees)
CAMI Automotive Inc.			
Car			
Ingersoll	Chev. Metro, Pontiac Firefly, Suzuki Swift	36,852 (31%)	672
Truck			
Ingersoll	Chevrolet Tracker, Suzuki Vitara	76,444 (73%)	1,317
CAMI Total		113,296 (50%)	1,989
% of CAMI N.A.		100%	100%
DaimlerChrysler Canada Ltd.			
Car			
Bramalea	Concorde, Intrepid, LHS, 300M	338,921 (134%)	3,965
Truck			
Pillette Road	Ram Van, Ram Wagon	83,860 (74%)	1,665
Windsor	Caravan, Voyager	373,947 (137%)	4,404
DaimlerChrysler Total		796,728	10,034
% of DaimlerChrysler N.A		25.8%	23.5%
Ford Motor Company of Canada, Ltd.			
Car			
St. Thomas	Crown Victoria, Grand Marquis	267,619 (115%)	2,625
Truck			
Oakville	Windstar	303,212 (103%)	3,459
Ontario Truck	F-Series	114,679 (55%)	1,377
Ford Total		685,510	7,461
% of Ford N.A		15.1%	13.0%
General Motors of Canada Ltd.			
Car			
Oshawa #1	Impala, Monte Carlo	250,871 (89%)	2,478

Assembler/Location	Product	1999 Output (Capacity Utilisation)	1999 Employment (# of employees)
Oshawa #2	Century, Lumina, Regal	264,759 (94%)	2,527
Ste. Therese	Camaro, Firebird	81,145 (35%)	1,135
Truck			
Oshawa	Sierra/Silverado Pickup	318,732 (126%)	3,496
GM Total		915,507	9,636
% of GM N.A		16.0%	12.3%
Honda of Canada Manufacturing, Inc.			
Alliston	Acura EL, Civic,	175,900 (103%)	n/a
	Odyssey	99,403 (83%)	
Honda Total		275,303	
% of Honda N.A		28.3%	
Toyota Motor Manufacturing Canada, Inc.			
Cambridge North	Corolla	147,718 (109%)	1,346
Cambridge South	Solara	63,363 (112%)	654
Toyota Total		211,081	2,000
% of Toyota N.A		28.3%	27.3%
Total Canada (excludes Honda)		2,997,425	31,120
% of Total N.A.		17.5%	16.6%

Source: The Harbour Report, 2000.

Figure 1.1: Location of Automotive Assembly Plants in Ontario


LT = Light Trucks
C = Cars
Alliston - Honda (C)
Oshawa -GM (C)
Bramalea - Chrysler (C)
Oakville - Ford (LT)
Cambridge - Toyota (C)
Ingersoll - CAMI (C, LT)
St. Thomas - Ford (C)
Windsor - Chrysler (LT)

Note: GM also operates an assembly plant in Ste. Therese, Quebec

Canadian Auto Parts

In 1999, Canadian automotive parts sales were $33 billion. Of the 555 automotive parts establishments in Canada in 1999, the twenty-one largest (by employment) were located in Ontario.[13] The largest parts producer is Magna International (see Table 1.2 for detailed information on the parts manufacturers with over 1,000 employees).

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[13] Information provided by the Automotive Parts Manufacturers' Association (APMA). It will be contained in a publication called "Major Automotive Assembler Investments Announcements Report, 2000", expected to be available for sale mid-February, 2001.

Table 1.2: Largest Canadian Automotive Parts Manufacturers

Company	Products	Country of ownership	Number of Employees
Magna International[1]	Stampings, Interior systems, plastics, engine components	Canada	22,047
Decoma	Exterior vehicle appearance systems, plastic body panels, lower bodyside systems	Canada	8,500
Ventra Group Inc.	Exterior and interior trim components, air and fluid reservoirs, parking brake fluid reservoirs, body, door & chassis hardware	Canada	6,400
Tesma International Inc.	Transmission and engine components & assemblies, fueling and cooling components and assemblies	Canada	4,270
Lear Canada[2]	Interior systems	United States	4,025
ABC Group	Molded plastic components, metal stampings	Canada	3,500
Dana Canada Inc.	Chassis Components, light truck and van frames, truck trailer axles, heavy truck brake remanufacture, hydraulic cylinders	United States	2,900
TRW Canada Ltd.	Steering and suspension components	United States	2,811
Husky Injection Molding Systems Ltd.	Plastic injection molding systems	Canada	2,500
A.G. Simpson Automotive Inc.	Stampings, bumper systems and modules	Canada	2,300
Cooper-Standard Automotive	Body sealing systems, chassis NVH systems	Canada	2,200
PPG Canada Inc.	Laminated windshields, tempered glass parts, door glass, heated windshields	Canada	2,200
Wescast Industries Inc.	Exhaust manifold – castings and machining	Canada	2,200
3M Canada Co.	Floor management products, electrical and electronic lighting products	Canada	2,100
Waterville TG Inc.	Weatherstrips and weatherseals	Canada	1,600
Budd Canada	Stampings, light truck frames, chassis component assemblies	Germany	1,650
Stackpole Ltd.	Powder metal components and systems assemblies for automotive engines and transmissions	Canada	1,500
Woodbridge Group	Molded foam products	Canada	1,485
Faurecia Automotive Seating	Seats, seat frames, seat tracks	Canada	1,200
Canadian General-Tower Ltd.	Automotive coverstock for seating, door and instrument panels	Canada	1,100
Gencorp Vehicle Sealing Division	Door seals, glassruns	Canada	1,000
TKA Fabco	Stampings, assemblies, weldments and systems	Canada	1,000

Source: *Automotive Parts Manufacturers' Association*, Directory of Canadian Automotive Parts Manufacturers, 2001. Magna Canadian employees number was obtained from Magna Annual Report for 1999.

[1] Magna International with all its subsidiaries in Canada.

[2] Lear Canada with all its subsidiaries.

Mexican Assembly

Six firms (GM, Ford, Daimler Chrysler, VW, Nissan, and Honda) currently assemble vehicles in Mexico. Table 1.3 below provides data on car production at these manufacturers' Mexican assembly plants for 1999.

Table 1.3: Mexican Assembly Plant Production

Assembler/Location	Product	1999 Output (Capacity Utilization)		1999 Employment (# of employees)
DaimlerChrysler				
Car				
Toluca	Cirrus, Sebring Conv., Stratus	92,870	(62%)	2,670
Truck				
Lago Alberto	Ram Pickup	143,707	(117%)	1,941
Saltillo	Ramcharger, Ram Pickup	96,455	(123%)	1,983
DaimlerChrysler Mexico Total		333,032		6,594
% of DaimlerChrysler N.A.		10.8%		15.5%
Ford				
Car				
Cuautitlan	Contour, Mystique	20,074	(27%)	649
Hermosillo	Escort, Focus, ZX2	126,940	(81%)	2,296
Truck				
Cuautitlan	F-Series	50,266	(70%)	2,455
Ford Mexico Total		197,280		5,400
% of Ford N.A.		4.3%		9.4%
General Motors				
Car				
Ramos Arizpe	Cavalier, Chevy, Sunfire	187,387	(135%)	2,813
Truck				2,935
Silao	Suburban, Yukon XL	129,736	(81%)	
GM Mexico Total		317,123		5,748
% of GM N.A.		5.5%		7.3%

Assembler/Location	Product	1999 Output (Capacity Utilization)		1999 Employment (# of employees)
Honda				
El Salto, Jalisco	Accord	10,305	(34%)	n/a
Honda Mexico Total		971,508		
% of Honda N.A.		1.1%		
Nissan				
Aquascalientes	Sentra	147,279	(49%)	n/a
Cuernavaca	Pickup, Vanette Van	37,708	(63%)	n/a
Nissan Mexico Total		184,987		
% of Nissan N.A.		36.3%		
Volkswagen		405,624	(104%)	n/a
Total Mexico		1,448,351		17,742

Source: *The Harbour Report, 2000*. The figures for Honda, Nissan and Volkswagen are estimates.

Like Canada, the Mexican assembly industry is concentrated within particular geographic regions, with most of the industry around Mexico City in the states of Guanajuato, Hidalgo, Mexico, Morelos, Puebla and the Federal District. In 1998,[14] plants in these areas accounted for almost half the total labour force (46%), more than half industrial assets (56%), the wages paid (56%), as well as more than half of the value of production (58%) and of the value-added (61%). The rest of the industry is distributed in eight other states: Aguascalientes, Chihuahua, Coahuila, Jalisco, Queretaro, Nuevo Leon, San Luis Potosi and Sonora (see Figure 1.2 below for plant locations).

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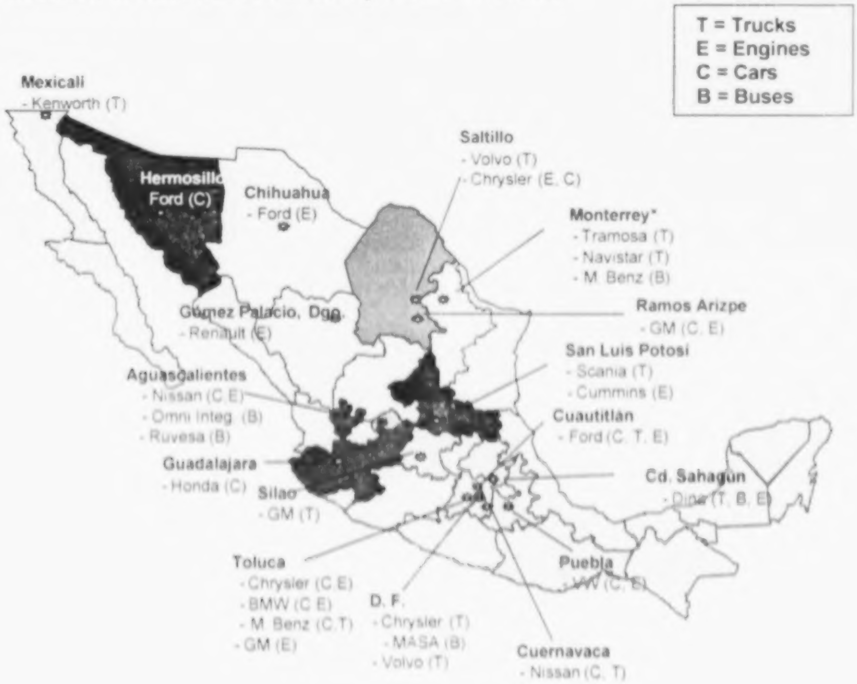
[14] INEGI, Economic Census 1999.

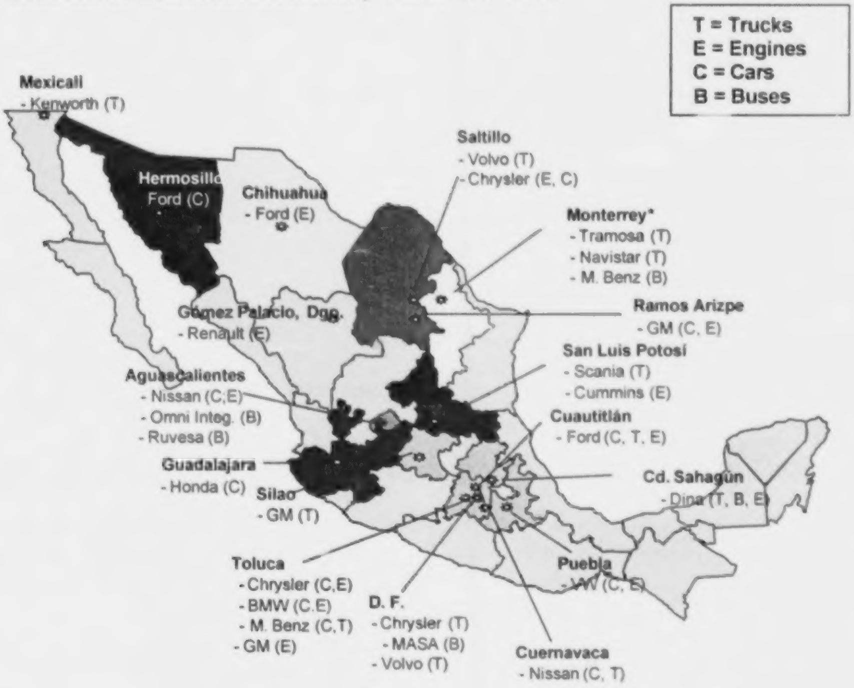
Figure 1.2: Location of Automotive Assembly Plants in Mexico


T = Trucks
E = Engines
C = Cars
B = Buses
Mexicali
- Kenworth (T)
Hermosillo
Ford (C)
Chihuahua
- Ford (E)
Saltillo
- Volvo (T)
- Chrysler (E, C)
Monterrey*
- Tramosa (T)
- Navistar (T)
- M. Benz (B)
Gómez Palacio, Dgo.
- Renault (E)
Ramos Arizpe
- GM (C, E)
San Luis Potosi
- Scania (T)
- Cummins (E)
Aguascalientes
- Nissan (C,E)
- Omni Integ. (B)
- Ruvesa (B)
Cuautitlán
- Ford (C, T, E)
Guadalajara
- Honda (C)
Silao
- GM (T)
Cd. Sahagún
- Dina (T, B, E)
Toluca
- Chrysler (C,E)
- BMW (C,E)
- M. Benz (C,T)
- GM (E)
D. F.
- Chrysler (T)
- MASA (B)
- Volvo (T)
Puebla
- VW (C, E)
Cuernavaca
- Nissan (C, T)

Mexico's 12 light-duty vehicle assembly plants (eight produce cars and four produce light-duty trucks) specialise in compact and subcompact cars, pickups and SUVs. The assembly of heavy-duty trucks and buses represents less than 4% of the total number of vehicles produced in Mexico, but its importance is growing.

The Big Three produce 60% of the total number of vehicles while four other manufacturers account for the rest: two of the remaining four have been established in Mexico for decades Nissan and Volkswagen, and two are new entrants BMW and Honda. See Table 1.4 below for total number of vehicles produced by manufacturer.

Figure 1.2: Location of Automotive Assembly Plants in Mexico


T = Trucks
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Mexicali
- Kenworth (T)
Hermosillo
Ford (C)
Chihuahua
- Ford (E)
Saltillo
- Volvo (T)
- Chrysler (E, C)
Monterrey*
- Tramosa (T)
- Navistar (T)
- M. Benz (B)
Ramos Arizpe
- GM (C, E)
Gómez Palacio, Dgo.
- Renault (E)
San Luis Potosí
- Scania (T)
- Cummins (E)
Aguascalientes
- Nissan (C,E)
- Omni Integ. (B)
- Ruvesa (B)
Cuautitlán
- Ford (C, T, E)
Guadalajara
- Honda (C)
Silao
- GM (T)
Cd. Sahagún
- Dina (T, B, E)
Toluca
- Chrysler (C,E)
- BMW (C,E)
- M. Benz (C,T)
- GM (E)
D. F.
- Chrysler (T)
- MASA (B)
- Volvo (T)
Puebla
- VW (C, E)
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Table 1.4: Total Number of Vehicles Produced in Mexico by Manufacturer

	1993	1994	1995	1996	1997	1998	1999	2000
BMW	—	—	245	487	970	1,932	1,596	1,594
DaimlerChrysler	228,428	243,701	205,575	361,212	355,914	359,422	330,290	404,637
Ford Motor	209,359	242,083	227,354	213,513	247,363	213,546	224,446	280,585
General Motors	192,279	161,099	198,823	267,133	300,900	316,028	331,021	444,670
Honda	—	—	135	1,194	3,045	7,194	10,241	18,801
Mercedes Benz	230	590	814	1043	955	722	190	n.a.
Nissan	185,922	193,591	106,794	135,637	172,763	189,787	185,574	313,496
Volkswagen	238,992	256,317	191,438	231,078	257,366	338,959	410,308	425,703
Total	1,055,210	1,097,381	931,178	1,211,297	1,339,276	1,427,590	1,493,666	1,889,486

n.a indicates not available.
Source: AMIA 2001.

Mexican Auto Parts

Production of automotive parts is carried out equally by regular producers as well as by *maquiladoras* (see Section 2 for a discussion of these two types of producers). In accordance with NAFTA, as of January 1, 2001, *maquiladoras* are subject to the NAFTA regime. Since this change is so recent, however, this section discusses regular producers and *maquiladoras* separately.

In Mexico, there are almost 250 *maquiladora* plants that produce automotive parts, most of them in the border states of Chihuahua, Coahuila, Nuevo Leon, Sonora and Tamaulipas. The value of their production in 2000 was estimated to be $20.6 billion, such that the combined sales of both types of firms (*maquiladoras* and non-*maquiladoras*) were C$40.9 billion.

Non-*maquiladora* automotive parts production grew at an annualised rate of growth of 10.0% between 1994 and 2000. During 2000, sales were $20.3 billion, 18.1% more than in 1999. Traditionally important sub-sectors, however, have fared better and some sub-sectors have risen as new stars. Among the top performers are drivetrains, engines and engine parts, which grew at annualised rates of growth of 14.8%, 18.7% and 30.3% respectively over 1994-2000 and whose sales amounted to $7.9 billion in 2000. Also strong performers were upholstery, carpets and panels, which collectively grew 28.9% and last year had combined sales of $2.1 billion. In turn, electric systems with sales of $2.5 billion[15] in 2000 grew at 13.1% between 1996 and 1999 but increased 24.3% last year (see Figure 1.3).

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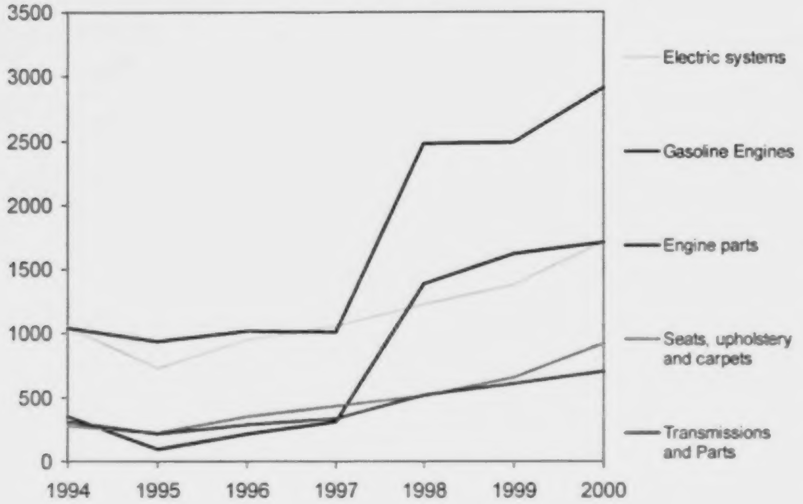
[15] An exchange rate of US$0.67=CDN$1.00 was used for figures reported in the two paragraphs above.

Figure 1.3: Selected Automotive Parts Production in Mexico



Most of the major multinational automotive parts suppliers maintain production facilities in Mexico. For example, each of the 10 largest OEM parts suppliers to North America for the year 2000 as identified by *Automotive News* maintain production facilities in Mexico.[16] In addition, three Mexican-based firms are large enough to rank in *Automotive News'* list of the top 150 OEM suppliers. Information on these firms is provided in Table 1.5, below:

Table 1.5: Largest Mexican Automotive Parts Manufacturers

Company	Products	2000 North American OEM parts sales (millions of U.S. dollars)	Rank among North American Suppliers
DESC SA de CV	Transmissions, axles, constant velocity joints, pistons	708	56
SANLUIS Rassini	Suspension and brake components	423	91
Nemak SA	Aluminum cylinder heads and engine blocks	361	106

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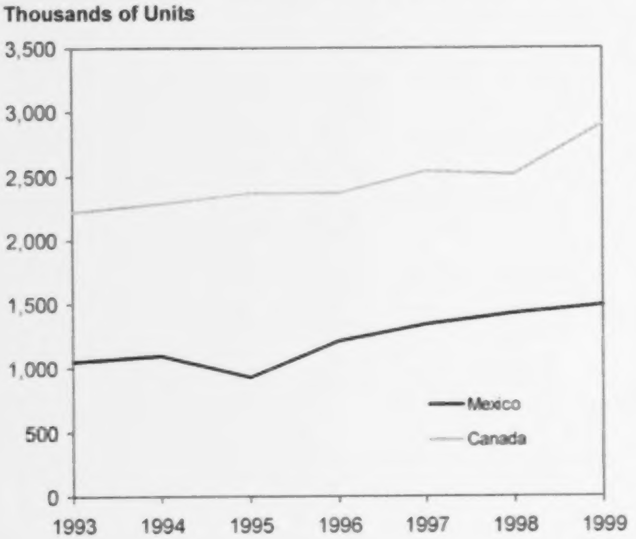
[16] Ranked by OEM parts sales in North America, the top 10 are: Delphi Automotive Systems, Visteon, Lear, Johnson Controls, Dana, Magna International, Robert Bosch, TRW, ArvinMeritor, and Denso International America (see *Automotive News Market Data Book 2001*, p. 29).

Comparison of Canadian and Mexican Production

Figure 1.4 below presents trends in vehicle production in Canada and Mexico. Canada's 15 light-duty vehicle assembly plants lead Mexico's 12 light-duty vehicle assembly plants. In 1999, Canadian plants produced approximately 3.0 million vehicles while Mexico produced 1.5 million.

In terms of growth, Canadian light vehicle production between 1993 and 1999 grew 34.3%, or at an annual compounded rate of 5.0%. Mexican growth in production during this period was 41.6%, or an annual compounded rate of 6.0%.

Figure 1.4: Vehicle Production in Canada and Mexico



While growth in the number of vehicles produced in Canada has not been as dramatic as the growth in Mexico, the value of shipments in Canada has been growing strongly. Between 1993 and 1999, the total value of shipments increased by 81% in real terms[17] corresponding to an annual compound growth rate of 10.4%. By contrast, between 1993 and 1999, Canada's real GDP grew at an annualized rate of 3.3%. The most important reason for this growth in automotive shipments has been the booming U.S. economy and the growth in consumption of durables within the U.S. Between 1992 and 1997, U.S. expenditures on durables grew 20.7% in real terms, which is equivalent to a yearly average growth rate of 5.1%. Real U.S. expenditures on durables further strengthened over the last two years growing at an annualized compounded rate of 8.4% between 1997 and 1999.

The difference between growth in unit production and shipments is reflected in the increased price per vehicle sold. The value of Canadian light-vehicle shipments per unit sold in 1993 was $19,917 in 1997 dollars. In 1999, the average shipment value per vehicle had increased to $24,659, a compounded annual increase of 3.6%. Most of this increase occurred between 1993 and 1995. From 1995 to 1997, the average shipment value per vehicle fell slightly from $23,625 to $22,040, but then rose again to $24,659 in 1999. The increase between 1993 and 1995 is partly due to an increase in overall North American demand for cars and light-duty trucks, given that supply is not perfectly elastic. Changes in the composition of demand, toward larger cars and trucks, plus increased quality and amenities have also contributed to the increase in average shipment value per vehicle.

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[17] Adjusted using the Ontario CPI-based inflation rate.

The impact of the booming U.S. economy and the increased price per vehicle sold also impacted Mexico. There, the growth in the value of shipments outstripped growth in the number of vehicles produced. For the years that data are available on the value of Mexican shipments, 1997-1999, the total value of shipments increased by approximately 22% in real terms. In contrast, during those years, the total number of vehicles increased by only 11%. The value of Mexican vehicle shipments per unit sold in 1997 was $19,203. In 1999, in terms of 1997 constant dollars, the average shipment value per vehicle had increased to approximately $21,554, an increase of 8.7%. Thus, in terms of the compound annual rate of growth, the Mexican increase in the average shipment value per vehicle is similar to that of Canada.

1.1.C Domestic Sales

A strong domestic market remains a competitive advantage in securing new investments in automotive production. Locating manufacturing operations close to large urban markets allows producers to save on transportation costs and benefit from shorter times to market. Despite a population three times as large as in Canada, in 1999, light-duty vehicle sales in Mexico were only half that in Canada due to Mexico's considerably lower per capita income levels. Given the pace of economic growth, however, Mexico's domestic market is expected to increase in size and importance.

Lower Mexican incomes are also reflected in consumer vehicle preferences. While subcompact and compact cars represented 27% of Canadian vehicle sales in 1999, in Mexico these segments represented 51%. SUVs and luxury vehicles accounted for only 5% of Mexican 1999 vehicle sales as compared with 17% of sales in Canada. Over the longer term, a well-developed Mexican consumer market for compacts and sub-compacts will likely reinforce Mexico's specialisation in this segment.

Vehicle ownership is already widespread in Canada and hence the vast majority of new vehicle sales represent replacement sales rather than additions to the vehicle stock. The stock of vehicles in operation continued to grow in recent years at a rate just under the population growth rate in Canada. This growth, however, has not been reflected in large increases in vehicle sales. In fact, retail sales of new light-duty vehicles in Canada have fallen from 1.54 million in 1988 to 1.5 million in 1999.[18] Instead, population growth has been accommodated by increases in vehicle longevity. The average age of vehicles in operation in Canada, for example, increased from 7.2 years in 1989 to 8.3 years in 1999.[19]

In contrast to Canada, Mexico is a less mature market offering greater long-term potential for vehicle sales. Sales are expected to grow faster than per capita income for years to come. Total sales in

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[18] *Statistical Review of the Canadian Automotive Industry: 1988 Edition*, Industry Canada, DesRosiers Automotive Consultants Inc.

[19] DesRosiers Automotive Consultants Inc.

2000 were 870,000 vehicles, a 50% increase over 1993 sales, and are expected to reach 1.05 million units by 2005. This forecasted sales growth is an important driver of assembly plant investment and consequent investment by auto parts manufacturers. Investment to serve the growing Mexican market will largely be directed toward the production of smaller vehicles, some of which may not be designed for export to the United States or Canada. As a result, Mexican plants producing such vehicles will not be in direct competition with Canadian plants as a source of potential supply of vehicles to U.S. and Canadian markets.

Decade-by-decade sales trends for the major North American markets are shown in Table 1.6 below. In the 1960s and 1970s sales of vehicles increased at a very rapid rate as the baby-boomers began purchasing vehicles for the first time. This was particularly pronounced in Canada due to the greater proportion of baby-boomers than in the U.S. The market, however, matured and growth in sales fell off in the 1990s. Average sales in Canada in the 1990s decreased from their levels in the 1980s, partly due to the slow recovery from the 1990-91 recession. In contrast, in the U.S. where the recovery from the recession was quick and sustained, decade over decade sales showed an increase in the 1990s.

Table 1.6: Historical Growth in Unit Sales in North America

Decade over decade growth	U.S.	Canada	Mexico
1970s vs. 1960s	34.2%	64.4%	194.8%
1980s vs. 1970s	5.9%	11.6%	29.1%
1990s vs. 1980s	8.3%	-3.3%	43.3%

Source: Ward's Research, DesRosiers Automotive Consultants (reproduced from Annex B of *Greenhouse Gas Options, Policy and Measures for the Canadian Transportation Equipment Manufacturing Industry – Final Report*, prepared by The Transportation Equipment Manufacturing Sector Working Group – National Climate Change Industry Table)

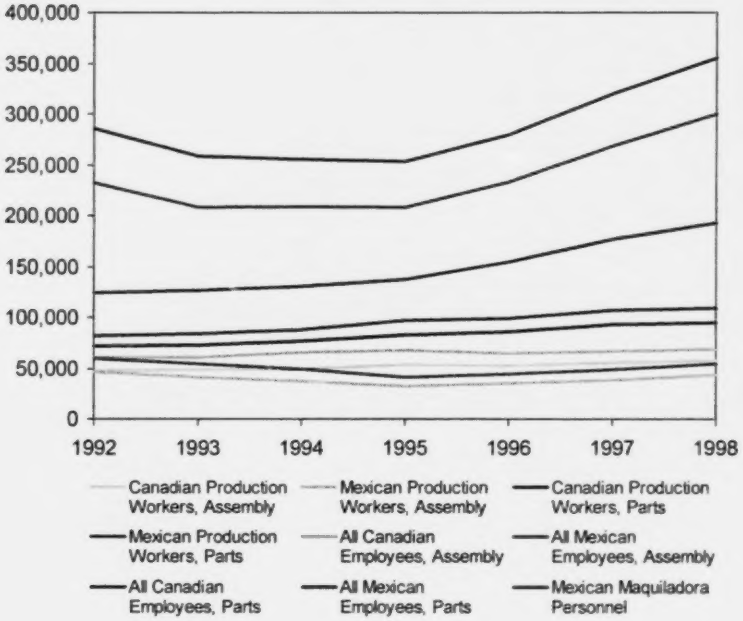
1.1.D Employment

Mexico has a much larger workforce employed in the motor vehicle sector overall compared than Canada as a result of its more labour-intensive mode of production. In terms of vehicle assembly alone, Canada and Mexico have relatively similar employment levels, despite the larger number of Canadian assembly plants. For parts, the Mexican sector has much higher levels of employment than in Canada reflecting the larger number of facilities in Mexico producing very labour-intensive parts. In 1999, Canada employed 104,593 production workers in the parts industry in contrast with 395,372 workers in Mexico (excluding workers in the *Maquiladoras*).

While there were about 5.6 times the number of workers employed in the automotive sector overall in Mexico compared to Canada, the differences are not as dramatic when compared to the total workforce within each economy. While 1.3% of the total Canadian labour force was employed in the automotive industry in 1999 (manufacturing of vehicles, vehicles parts and accessories),[20] this figure was 1.1% for Mexico.[21]

In 1999, the Canadian automotive manufacturing industry employed about 158,112 workers working directly in production. In 1999, employment in the Canadian automotive manufacturing industry represented 7.13% of total Canadian manufacturing employment and 1.3% of the Canadian labour force. In 1999, the Mexican non-*maquiladora* automotive industry employed more than 456,000 persons and an additional 208,766 persons in the *maquiladoras*.[22] Between 1988 and 1999, total employment in the Mexican automotive industry grew 127%: 49% growth in vehicle assembly and 123% growth in the production of automotive parts (see Figure 1.5 below). By the end of 2000, there were 255 *maquiladora* plants employing 244,238 persons. In 1999, employment in the Mexican automotive manufacturing industry represented 13% of total Mexican manufacturing (including manufacturing in the *maquiladoras*) and 2.1% of total employment.

Figure 1.5: Automotive Industry Personnel in Canada and Mexico



Current salaries reflect the much lower cost of labour in Mexico. Salaries in these industries are significantly lower in Mexico, less than one quarter the salaries paid in Canada. Notwithstanding this, in both countries, the motor vehicle sector pays wages significantly higher than the average manufacturing wage and also higher than the average national wage. In the motor vehicle parts and accessories industries, wages are much closer to the average manufacturing wage, but still significantly above the average national wage. Greater information on labour costs and productivity is provided in Sections 3 and 4.

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[20] Note: these numbers represent only production workers and not the total workforce in the automotive sector.

[21] Statistics Canada "Manufacturing Industries of Canada: National and Provincial Areas. 1998" as well as CANSIM.

[22] For example, 70,000 workers in the harness industry in the State of Chihuahua.

1.2 IMPORTANCE WITHIN NORTH AMERICAN AUTOMOTIVE SECTOR

1.2.A Production Share within North America

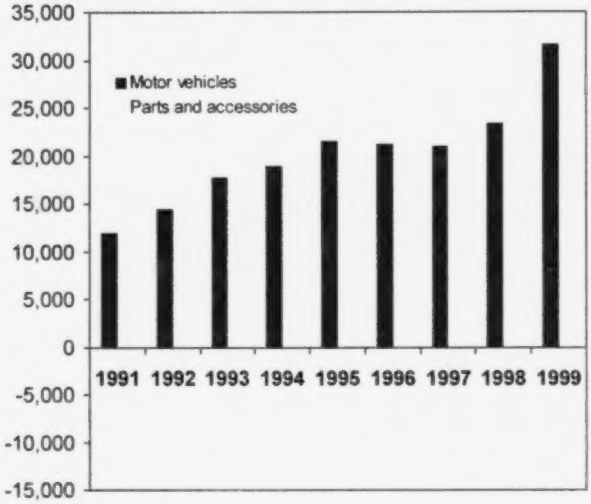
In terms of share of North American assembly, Canada is double the size of Mexico. In 1999, Canada accounted for 17.5% of North American light-duty vehicle production and 15.3% of labour employed in its production. As most production is in Ontario, these figures change little when only Ontario is included in these calculations. Ontario produced 17.4% of all North American light-duty vehicles and employed 14.7% of all North American labour employed in its production. In contrast, Ontario's population is only 3.7% of the total population of Canada and the U.S. Similarly, Ontario's GDP represents only about 4.0% of total North American GDP. In 1999, Mexico's light-duty vehicle production represented 8.7% of North American production, a share that has been growing steadily since 1994, when it represented 7.0%.

1.2.B Trade Position

The U.S. is the primary automotive market for both Canada and Mexico. The U.S. represented 99% of Canada's vehicle exports and 95% of its parts exports in 1999. Canadian exports have risen sharply in the past two years in line with the strong growth in the consumption of durables in the U.S. In addition to strong growth in American GDP and expenditures on durables, the depreciation of the Canadian dollar is also partially responsible for the increased value of exports. Ontario has maintained strong surpluses in automotive product trade with the U.S. This is of little surprise given the volume of exports from Ontario. Moreover, last year, net exports to the U.S. (excluding heavy-duty vehicles) reached $30.3 billion. In real terms, this is a 49% increase from the previous year, driven by a surge in exports of assembled vehicles to the U.S.

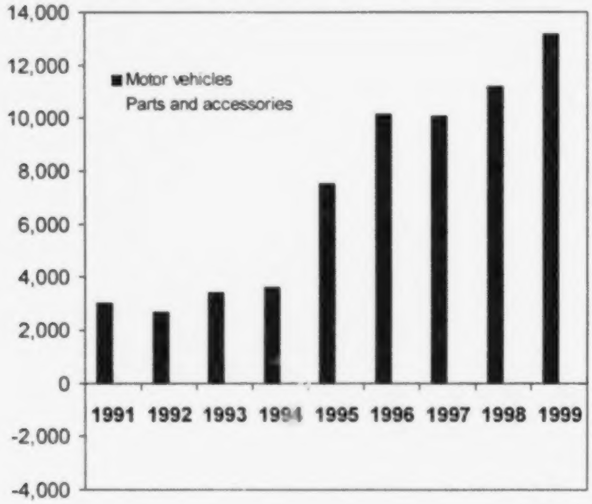
In the case of Mexico, the U.S. represented 87% of Mexico's vehicle exports and 95% of its parts exports in 1999. Mexico's automotive trade with the U.S. is smaller than that of Canada. Mexico's automotive exports to the U.S. were 34% of Canada's exports to the U.S. in 1999. Automotive imports were also smaller with Mexico's automotive imports from the U.S. equal to 23% of Canadian imports from the U.S. in 1999. Figure 1.6 shows automotive exports and imports to and from the U.S. for Canada and Mexico.

Figure 1.6: Canada's Automotive Trade Balances with the U.S. (Exports less Imports)



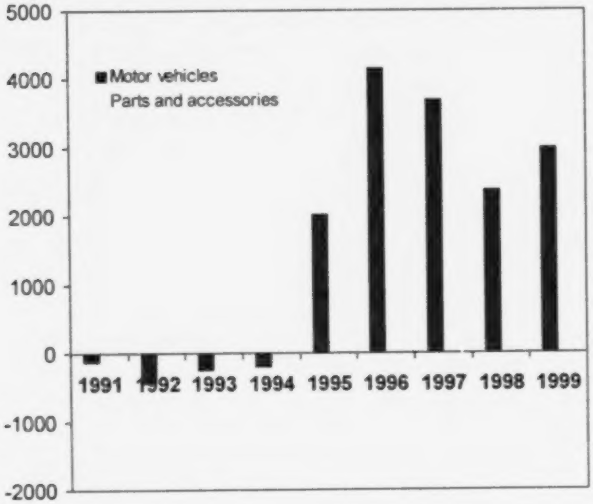
In Canada, a deficit in automotive parts fuels a growing positive trade balance with the U.S. in finished vehicles. In contrast, Mexico has gone from a positive trade balance in parts and accessories prior to the introduction of NAFTA, to a small negative trade balance in 1999. This reflects an increased flow of parts into Mexico for the assembly of finished motor vehicles, as illustrated by Mexico's growing U.S. trade surplus in motor vehicles. Figure 1.7 illustrates the trade balance situation.

Figure 1.7: Mexico's Automotive Trade Balances with the U.S. (Exports less Imports)



Mexico's positive trade balance in motor vehicles with its other trading partners (i.e. non-U.S.) illustrates its growing competitiveness as a global centre for automotive production. Mexico has managed to diversify its trade, with 13% of its vehicle exports destined for non-U.S. markets. By contrast, Canada has a trade deficit in motor vehicles with its other trading partners and sends only 1% of its vehicles to countries outside the U.S. (see Figure 1.8 below).

Figure 1.8: Mexico's Automotive Trade Balances with Non-U.S. Countries (Exports less Imports)



Both Canada's and Mexico's shares of North American car production have grown significantly under NAFTA. Canada's share of car production rose from 14% in 1994 to close to 20% in 1999, compared with a 9.8% share for Mexico in 1994, increasing to a 12% share for Mexico in 1999. In light truck production, neither Mexico nor Canada have significantly increased their share of North American production since 1994. While NAFTA resulted in a jump in Mexico's share of production from 3.3% in 1994 to 5.6% in 1996, this share has remained relatively stable since then, between 5.5% and 6%. Canada's share of production has remained stable, fluctuating between 15% and 16%.

Lower Canadian and Mexican labour costs relative to the U.S. have added to each country's advantage in the car segment of the market, generally considered to be a more labour intensive and mature market. Nonetheless, in recent years, both Canada and Mexico have increased their production of light trucks and SUVs. It remains to be seen whether they can capture a greater share of this lucrative market segment.

Apart from the very recent spectacular growth in exports, the volume of trade in both directions is also notable. Traditional trade theory posits that countries tend to specialise and, consequently it does not generally predict large trade flows in similar products (cross-hauling). The theory of economic geography that gained popularity in the 1990s, however, is consistent with the large regional concentration of production that crosses borders.[23] When consumers and factors of production are mobile, transportation costs alone can result in the geographic concentration of industry, workers and consumers. However, the direction of causality is rather murky in that the decisions on where workers and consumers will locate are not thought to be made sequentially but are intertwined with each other.

In fact, the current location of the automotive industry may be mostly explained by initial conditions. Historically, the U.S. industry grew up in Michigan and the Canadian industry in Ontario for reasons that may be of no particular economic relevance today in that if the industry were only developing today, it might locate in quite a different region. Nonetheless, these initial location decisions have had long-lasting effects. The initial location of assembly plants in one region spurred the development of supplier plants in that region to support them and also created a pool of skilled workers to support both assembly and parts plants. Having established a presence in a particular location, demand for a transportation infrastructure to support the industry was also created. In turn, this concentration of assembly plants, suppliers, workers, and transportation infrastructure in close proximity made the region an attractive one for further investments, since: (i) prospective assemblers wanted to be close to existing suppliers; (ii) prospective suppliers wanted to be close to existing assemblers; and, (iii) both assemblers and suppliers wanted proximity to workers and transportation networks. Thus, through a series of mutually reinforcing location decisions, the industry grew into its current form, in which most North American production is concentrated in the Highway 1-75/Highway 401 corridor.

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[23] In fact, one of the facts economic geography has sought to explain is why U.S. motor vehicle and parts production is concentrated along the so-called I-75 corridor, in close proximity to Interstate Highway 75. The I-75 corridor extends into Ontario along Highway 401.

This is relevant insofar as it suggests an incumbency effect in which existing plants are unlikely to relocate outside the current region of production unless exposed to a very large exogenous shock to the existing system. Moreover, the same factors that make existing plants unlikely to leave – the concentration in close proximity to an existing base of assemblers, suppliers, trained workers, and transportation infrastructure – even today make the current production region a preferred area for new additions to capacity.

1.2.C Investment

Not surprisingly given the different total base of automotive investment in each country, Mexico has seen greater investment in the sector over the past 20 years compared to Canada. Indeed, since 1979, the Big Three have closed 49 plants[24] in North America, while opening 31 new ones.[25] In this process, Canada has gained one plant on balance while Mexico has gained eight plants in all segments of production: assembly, stamping, transmission as well as engines. In keeping with these historical trends, Canada has also seen a much lower level of automotive investment under NAFTA than Mexico. While Canada attracted investment of $22.1 billion in automotive machinery, equipment and construction from 1994 to 1999, including both foreign and domestic spending, Mexico attracted $47.7 billion in foreign investment alone.

To a certain extent, this level of investment represents an adjustment to more open automotive trade under NAFTA. It remains to be seen whether automotive investment in Mexico will continue at the same pace in the coming years.

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[24] General Motors closed 10 plants, Ford closed 8 plants and DaimlerChrysler closed 31 plants.

[25] General Motors opened 9 plants, Ford opened 7 plants and DaimlerChrysler opened 15 plants.

2. ECONOMIC ENVIRONMENTS FOR INVESTMENT

This section of the report compares the economic environments of Canada and Mexico, focusing on broad issues such as the macroeconomic situation, government policies, and socio-economic factors, as well as factors that more directly affect the competitiveness of the two countries' respective automotive industries, mainly the state of capital, labour, infrastructure, and R&D support.

While a large number of macroeconomic, government and socio-economic factors are discussed below,[26] ultimately, there are only a handful that are regarded by industry participants as determinative of investment location decisions. That is, while many factors collectively lay the groundwork for attracting investment generally, on the margin there are only a few factors that differentiate Canada and Mexico, the most important of which is labour cost. Table 2.1 below provides a brief summary of the key factors discussed in this section of the report.

Table 2.1: Summary of Factors Affecting Investment Environments in Canada and Mexico

	Canada	Mexico
Macro economic Factors:		
Gross Domestic Product (per capita in 2000)	**$42,575**	**$13,637**
Interest Rate (in real terms for 2000)	3.04%	5.92%
Inflation (in 2000)	2.7%	9.0%
Exchange Rate (per $US in 2000)	CDN$1.50 = US$1.00	9.7 pesos = US$1.00
Unemployment (in 2000)	6.8%	Not comparable
Investment (as % of GDP in 2000)	19%	20%
Government Policies:		
Trade Policy	Open	Open
Automotive Trade Restrictions	Auto Pact/NAFTA	Expiring Auto Decrees/NAFTA
Labour and Employment Policy	Various mandated benefits	Comparable
Environmental Policy	Strict regulations	Comparable
Marketplace Framework	Reduced regulation	Comparable
Stability (EIU* ranking for 2001-2005)	Ranked #3	Ranked #31
General Corporate Tax Rate (in Ontario)	29% (by 2005)	34% (2000)

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[26] Pursuant to instructions from Industry Canada.

Competitiveness Factors for Attracting and Maintaining Automotive Support: Comparison Between Canada and Mexico

Table 2.1 continued

	Canada	Mexico
Socio-Economic Factors:		
Legal System (in Ontario)	Common law system	Civil law system
Crime/Safety (1997 % of GDP spent)	1.1%	0.2%
Health (1997 % of GDP spent)	8.9%	1.6%
Education (1997 % of GDP spent)	12.9%	2.0%
Living Conditions (HDI** in 1998)	Ranked #1	Ranked #55
Capital:		
Technology (spend as % of GDP in 1999)	1.64%	0.5%
Investment (annual growth rate since 1996)	17%	11%
Availability and Costs	General availability	Comparable for multinationals
Labour Productivity	Upper ½ of NA facilities	Lower ½ of NA facilities
Availability of Skilled Labour (in 1997)	Ranked #3	Ranked #10
Unionisation (Auto Industry Average)	60%	100%
Labour Relations	Negotiate Economic and Workplace Issues	Negotiate Economic Issues Only; Infrequent Strikes
Wages and Mandated Benefits (Assembly)	$64,146	$16,685
Turnover	Low	Comparable
Infrastructure:		
Transportation	Extensive high quality network	Improving network
Communications	Low rates	Somewhat higher rates
Land/Buildings/Construction Costs	Vary by area	Lower cost generally
Electricity: Availability and Cost	Extensive and low cost	Not ubiquitous
Natural Resources: Availability and Cost	Rich in resources	Comparable except water
R&D Support:		
University R&D and Research Centres	Various programs	Various programs
Government R&D and Research Centres	Various programs	Various programs
Industry R&D and Research Centres	Relatively low spend	Less than Canada

* Economist Intelligence Unit.

** Human Development Index.

2. Economic Environments in Canada and Mexico

2.1 MACROECONOMIC ENVIRONMENT

Most economic statistics in Mexico show a pronounced dip in 1995 and 1996 because of the December 1994 *tequila* crisis. Under pressure from the international community, the peso was allowed to freely fluctuate in December 1994. As a result, the peso was devalued by 50% at the end of 1994 and by an additional 50% during 1995, crippling the economy. During 1995, inflation shot up to 52.0% and GDP fell 6.2%. Both effects were more dramatic than at any other time during the 1980s. Per capita income did not recover to its 1994 level until 1997. This is also the case with most of the indicators in the automotive industry. Thus, to understand long-term trends, comparisons should be made whenever possible with 1993 or 1994 before the crisis and before NAFTA.

While Canada and Mexico start from a different initial economic position, the general performance of both countries has been broadly similar since 1995, being characterised by strong growth, low inflation and declining unemployment. Mexico pulls ahead of Canada in terms of overall growth and declines in the unemployment rate, while Canada fares better than Mexico with respect to inflation. This remarkable performance is attributable to a number of items chief among which is the strong U.S. economy and fiscal policies in both countries designed towards deficit reduction. Below, we provide summary information on gross domestic product, interest rates, inflation, exchange rates, unemployment and investment.

Over the long term, the most important feature of the macroeconomic environment relevant to automotive plant location decisions will be Mexico's expected growth in domestic income. Both Canada and the United States have mature economies and vehicle markets, with high levels of income and car ownership. While these mature markets can anticipate steady growth in GDP and vehicle sales over the longer term, neither is likely to be explosive. By contrast, Mexican economic conditions suggest relatively high expected GDP growth and low initial levels of vehicle ownership which could produce a rapidly growing vehicle market.

2.1.A Gross Domestic Product

Figure 2.1 below compares Canadian and Mexican GDP per capita. In the case of Mexico, 2000 GDP per capita was $13,637 (or US$9,137) on a purchasing power parity basis. In Canada, the 2000 GDP per capita was roughly three times higher at $42,575 (or US$28,525)[27] on a purchasing power parity basis. (Note that the figure below is in U.S. dollars).

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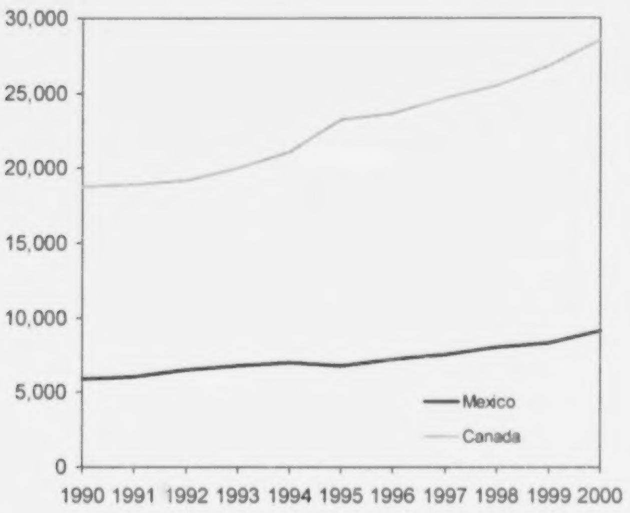
[27] An exchange rate of US$0.67=CDN$1.00 was used for both figures reported in the paragraph.

Figure 2.1: Gross Domestic Product Per Capita in Canada and Mexico (PPP $U.S.)



While Canada has seen steady and strong increases in GDP since 1994 (annual GDP growth ranging from a low of 1.6% in 1996 to a high of 5.7% in 1994), Mexican growth has been stronger still. Since the 1994-1995 Mexican peso crisis, Mexico has sustained steady and strong increases in its GDP ranging from a low of 3.8% in 1999 to a high of 6.9% in 2000, despite exchange rate adjustments brought about by the Asian crisis which threatened Mexico's exports. The Asian crisis was weathered well because the Mexican GDP growth rate has been fueled by the sustained recovery of domestic demand rather than exports.

The Mexican economy was particularly strong in 2000, when it posted its highest growth rate since 1981, exceeding the estimates that were made at the beginning of the year by almost three percentage points. This particularly positive performance is the result of a favourable external environment and dynamic domestic demand. External demand was fuelled by a strong U.S. economy and high international oil prices that translated into a 22% increase in Mexico's exports. On the domestic front, consumption increased by 8% and there was a 13% increase in investment in 2000.

For 2001, Mexican GDP is expected to grow between 4.5% and 5.0% in real terms. The Bank of Canada forecasts real Canadian GDP growth of 3.0% in 2001.[28] The 2001 growth figures are in line with the rates of growth that Canada and Mexico are expected to be able to sustain over the longer term - the OECD estimates that long-term growth in potential output for Canada will be between 3.0% and 3.5% per year, while estimating a 5.0% rate of growth as sustainable for Mexico.[29]

Auto Sector GDP

Both Canada and Mexico have seen strong growth in real GDP attributable to the automotive sector. Despite significant annual fluctuations, Mexican automotive GDP grew at an average compound rate of 8.8% per year between 1988 and 1999. Canadian automotive GDP grew at an average compound rate of 6.1% per year over the same period. Figure 2.2 shows yearly growth rate in automotive GDP for Mexico and Canada between 1988 and 1999.

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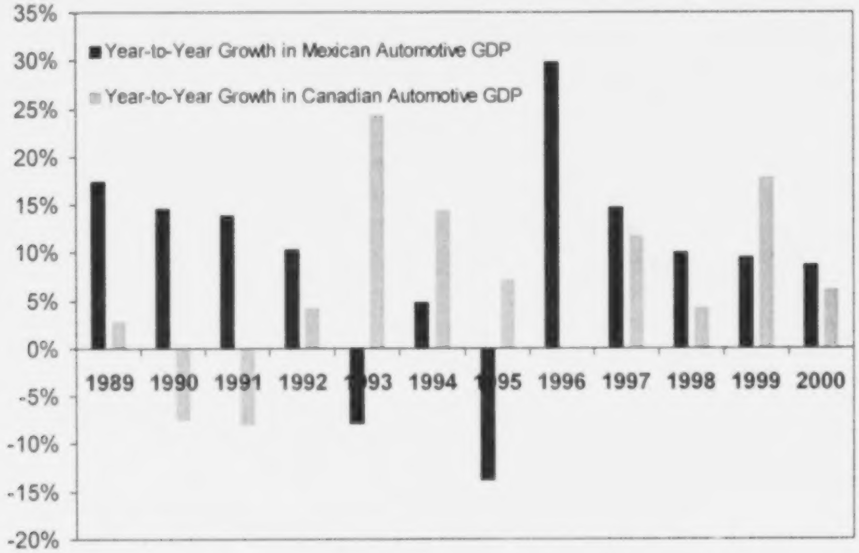
[28] Bank of Canada, Monetary Policy Report Update, February 2001.

[29] OECD Economic Outlook No. 68, Dec. 2000, p.66 (Canada) and p. 97 (Mexico).

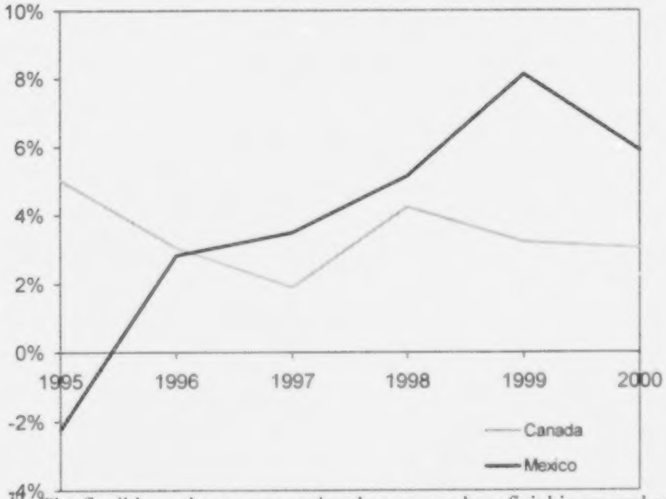
Figure 2.2: Automotive GDP Annual Growth Rates



2.1.B Interest Rates

Real interest rates in Mexico are higher than those in Canada, and are also more volatile as illustrated in Figure 2.3 below.

Figure 2.3: Real Annual Interest Rates in Canada and Mexico



After the 1994-1995 Mexican peso crisis, there were occasional episodes of exchange rate and interest rate volatility prompted by crises in the Asian, Russian and Brazilian economies. While resulting in some volatility, these crises have not impacted the overall downward trend in interest rates, which has been actively pursued by the government through exchange rate flexibility.[30] Presently, real interest rates in Mexico are about 5% (based on 28-day Treasury Certificates). During

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[30] The flexible exchange rate regime has proven beneficial in several regards. First, it has dissipated the impact of external shocks, like those observed in 1994. Second, it has created disincentives against speculative short-term capital flows. Third, it has provided for a more orderly adjustment of the economy by allowing market forces to distribute the impact of external shocks on interest rates and the foreign exchange rate.

2000, the rise in Mexican interest rates in October and November can be attributed to two factors: (i) a greater restriction in the money market due to increases in the *corto*[31]; and, (ii) an adjustment in inflationary expectations on the part of economic agents.

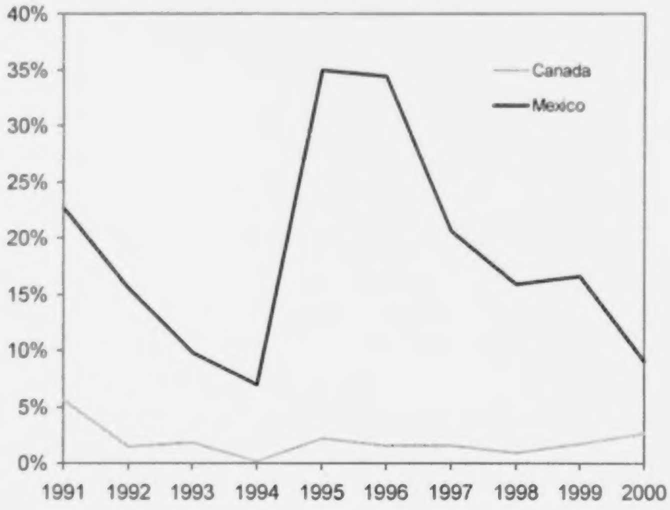
Nominal interest rates in Canada generally fell between 1995 from 7.24% (3.04% in real terms) (annualised Canadian Bank rate for short-term loans) to a low of 3.5% in 1997 (1.9% in real terms) and then started to rise again. The annual nominal interest rate for 2000 was 5.74% (3.04% in real terms).

While domestic interest rates are generally higher in Mexico than in Canada, this has only minor implications for investment, because multinational firms typically finance investment out of internal cash flows or have access to broader international capital markets and hence domestic interest rates are not critical for investment decisions.[32]

2.1.C Inflation

Unlike Canada's consistently low inflation levels over the last decade, Mexico has experienced dramatic changes in inflation over the period, as illustrated in Figure 2.4 below.

Figure 2.4: Inflation Rates in Canada and Mexico



The Mexican stabilisation program introduced in 1995, combined with a favourable international economic climate, has been successful in combating the sharp increase in the annual inflation rate that characterised the Mexican peso crisis, when inflation was as high as 52%. A significant deflationary process began in early 1996 and lasted until late 1997. The inflation rate bounced back in 1998 reaching 18.6%, nearly three percentage points above 1997 levels (15.7%) and six percentage points above the 12% target for that year. The factors that contributed to the 1998 increase in Mexican inflation included the lack of stability in international financial markets, the decline in oil prices and deteriorating terms of trade that put pressure on the exchange rate. A depreciating peso also directly impacted the consumer price index (CPI) through the price of tradable goods which, in turn, generated upward movements in inflationary expectations. Such expectations brought about higher than expected wage revisions and higher prices for a wide variety of non-tradable goods and services. In addition, unexpected increases of certain prices subject to government control, an unusual increase in prices of fruits and vegetables due to bad weather and the anticipated increases in minimum wages contributed to push inflation above Banco de Mexico's original target.

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[31] The *corto* is a mechanism by which commercial banks are left overdrawn in their daily balances with the central bank and therefore liable to a penalty rate of interest at twice that for 28-day Treasury Bills.

[32] Domestic interest rates would be expected to impact domestic consumption decisions, however.

The recent upward trend was reversed in 2000 when inflation experienced a steady decline as a result of fiscal discipline, the maintenance of a restrictive monetary policy by Banco de Mexico and relative stability in financial and foreign exchange markets. As a result, the accumulated rate of inflation in 2000 was almost 9%, the lowest rate since 1994. The objective of the Mexican government is to achieve a further decline to 6.5% in 2001, 4.5% in 2002, and 3% in 2003. Even if they are achieved, these modest (by Mexican standards) rates of inflation are still greater than those anticipated in Canada, where the Bank of Canada believes that long-term inflationary expectations are should remain near 2% per year. Both the Bank of Canada and consensus forecasts project roughly a 2.4% growth in CPI in 2001.[33]

Historically, the volatility of inflation in Mexico has created an additional source of uncertainty for investment in that country. Mexico has made great progress recently in holding inflation at relatively modest levels. If it succeeds in achieving relative price stability, it will have improved the climate for investment.

2.1.D Exchange Rate

Since December 1994, when Mexico introduced a flexible exchange rate system, the peso has been quite stable against the U.S. dollar (see Figure 2.5). The only times at which significant variations occurred was when the Mexican economy was subject to external shocks, such as the financial crises in Asia, Russia, and Brazil, and when oil prices fell in 1998.

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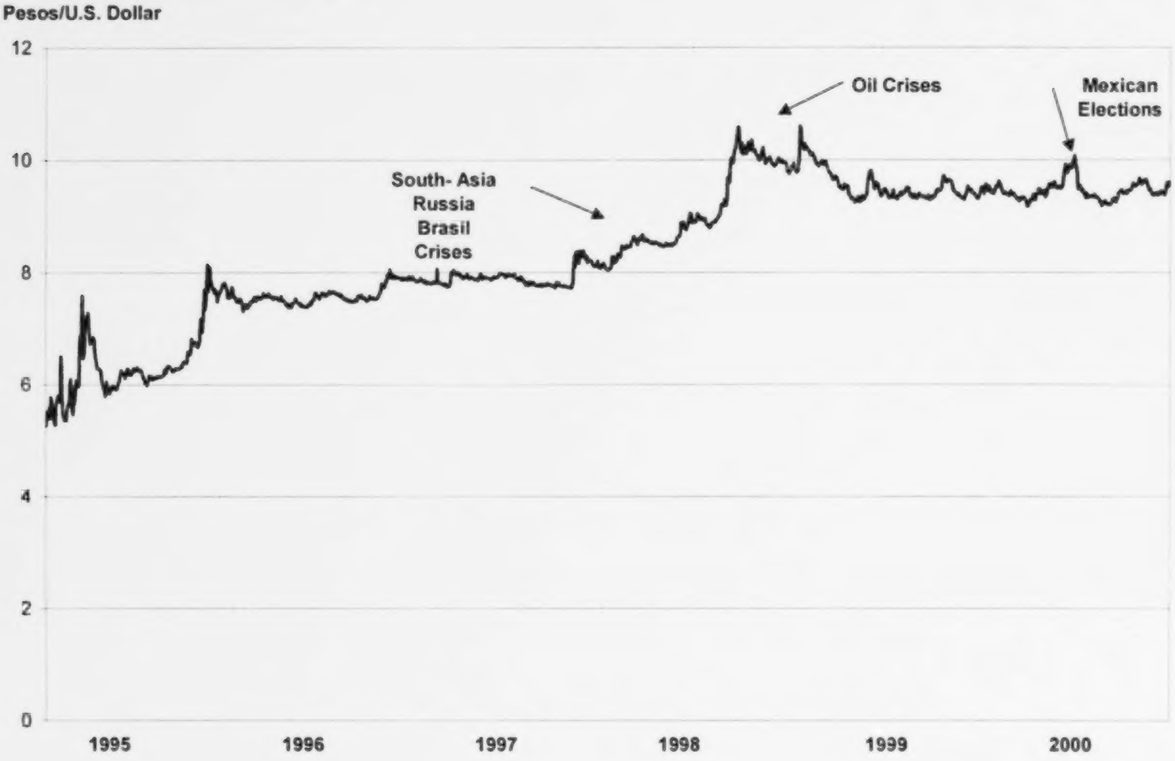
[33] Bank of Canada, Monetary Policy Report Update, February 2001, p. 6.

Figure 2.5: Mexican Exchange Rate

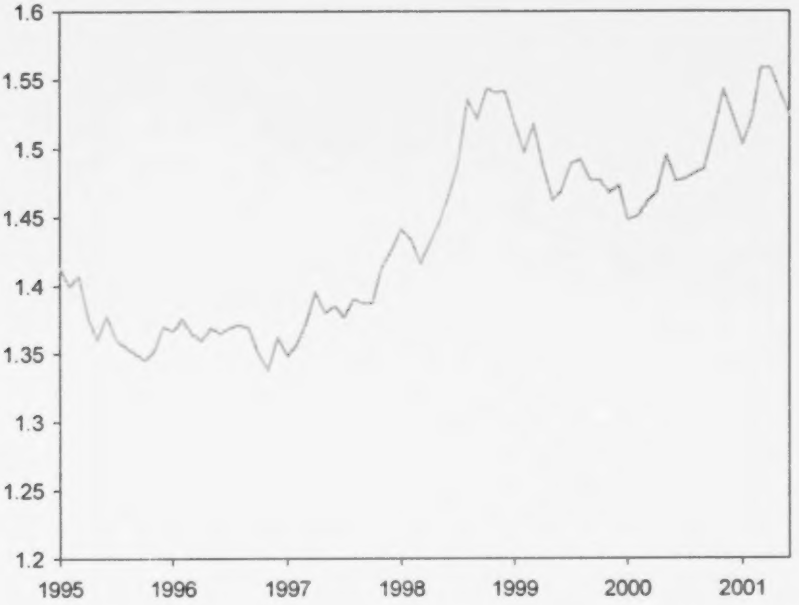


Between May 1999 and May 2000, the exchange rate varied between 9.3 and 9.6 pesos per U.S dollar, except for two brief drops in the value of the peso in late May 1999 and October 1999.

In June of 2000, a bubble of instability began which was sparked by the presidential elections on July 2. There was a small run on the peso and, as a consequence, the U.S. dollar reached 10.07 pesos on June 27, 2000. However, when the incoming administration proclaimed that there would be continuity in economic policies, foreign investment returned and the peso/U.S. dollar exchange rate returned to the level it was at prior to the elections. The bubble of instability only lasted three-and-a-half weeks. More generally, strong growth in the U.S. economy in 2000, which resulted in an increase in Mexican exports, caused the peso to strengthen against the U.S. dollar. During 2000, the nominal exchange rate increased 9.5% despite a goal that it remain stable relative to 1999 rates.

Canada's exchange rate against the U.S. dollar was fairly steady between 1994 and 1997, with a U.S. dollar costing approximately $1.37 in Canadian funds. In 1998, the Canadian dollar depreciated dramatically to about $1.49 Canadian per U.S. dollar and has been relatively steady at this rate since (see Figure 2.6 below).

Figure 2.6: Canadian Exchange Rate ($CDN per $US) 1995–2001

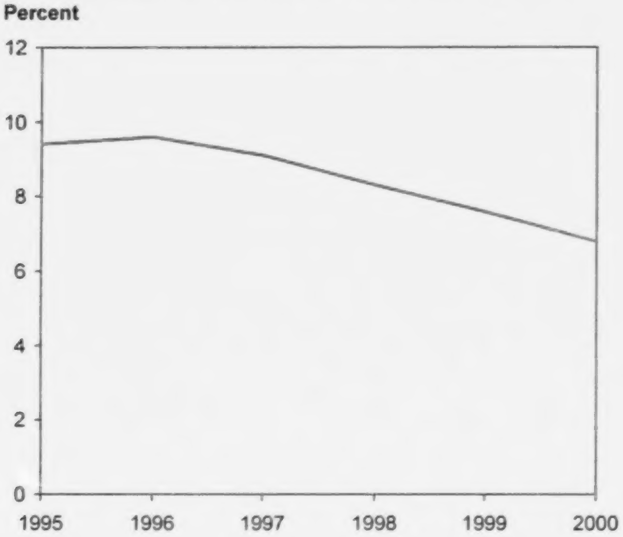


Canada's competitive position as a potential source of automotive production has been strengthened by the weakness of the Canadian dollar. All else equal, it is generally the case that investors prefer to invest in countries in which the exchange rate is expected to remain relatively stable. The Canadian dollar has tended to be more stable in trading against the U.S. dollar over the 1990s compared to the Mexican peso. However, in very recent years, the Mexican peso has been relatively stable against the U.S. dollar.

2.1.E Unemployment

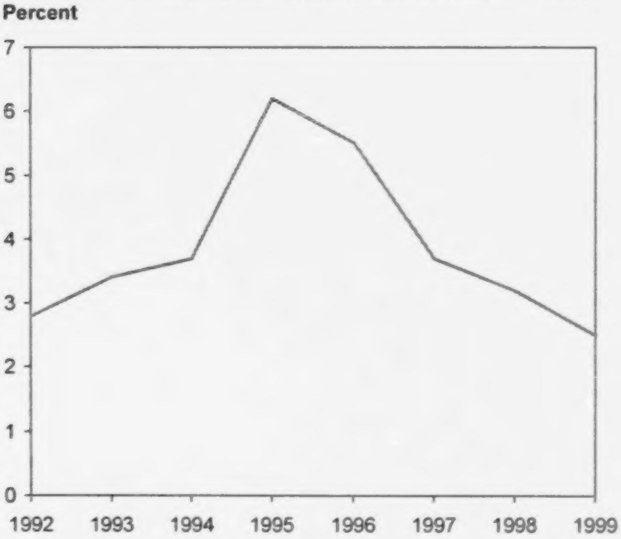
Unlike the earlier macroeconomic statistics, it is difficult to directly compare Mexican and Canadian unemployment levels, given differences in definition and measurement. Canada uses a more liberal definition of unemployment and greater accuracy of measurement than Mexico, and as a result, unemployment levels noted below for Mexico are understated relative to Canada's definition. We do not know the magnitude of this bias. Consequently, while levels are not comparable, there are similarities in unemployment trends in the two countries. Unemployment in Mexico has been steadily declining since mid-1995 (see Figure 2.7). Similarly, the Canadian unemployment rate has been steadily declining since 1995, when the unemployment rate was about 9.4% (see Figure 2.8).

Figure 2.7: Unemployment Rate in Canada, 1995–2000



While tight labour markets tend to create pressure to increase wages, overall national unemployment rates are not directly relevant to most investment decisions in the Mexican automotive industry, since the labour market relevant to any particular plant is local rather than national. In terms of local conditions, we find anecdotal evidence of very tight labour markets and rising wages in some areas of Mexico where industrialisation has proceeded at a rapid pace, such as, for example, the state of Coahuila.

Figure 2.8: Unemployment Rate in Mexico, 1992–1999



2.1.F Investment

Gross Fixed Investment

Total investment as a percentage of GDP is similar between Canada and Mexico, at about 20% in 2000. Mexico reached this level in 2000 as a result of significant and steady annual growth in gross fixed investment (11.4% in real terms on an average basis between 1996 and 1999). Gross fixed investment grew at an annual real rate of 9.8% in the first nine months of 2000, with investment in machinery and equipment growing 12.0% in the same period. This reflects Mexico's improved business climate as well as the favourable forecasts for the Mexican economy.

Automotive Investment

Investment in the Mexican automotive sector has followed the positive trend for overall growth in investment. In 1999, foreign investment in the Mexican automotive industry was $3 billion (or US$2 billion), representing 26.2% of foreign direct investment (FDI) in manufacturing and 19.7% of the total FDI in Mexico.[34] [35] In 1999, 58% of the FDI in the automotive sector came from Japan, 34% from the United States and almost 4% from Canada.

In Canada, historically, the bulk of capital expenditures in the automotive industry has been in machinery and equipment, rather than new plants. For transportation equipment manufacturers as a whole, between 1991 and 1999, capital expenditures on machinery and equipment averaged 88.5% of total capital expenditures with the remaining 11.5% going to construction (excluding repair), and this division of expenditures is almost identical in both the assembly and auto parts sectors. As Figure 2.9 shows, deflated capital expenditures in light-duty vehicle assembly facilities more than doubled between 1991 and 1997. (Capital expenditures in the Canadian automotive parts industry peaked three years before capital expenditures in the assembly industry.) Year-to-year fluctuations in capital expenditures in vehicle assembly facilities, such as the declines seen between 1997 and 1998 may reflect the timing of new model introductions, since most major expenditures for tooling and changed production processes are undertaken in conjunction with major vehicle redesigns.

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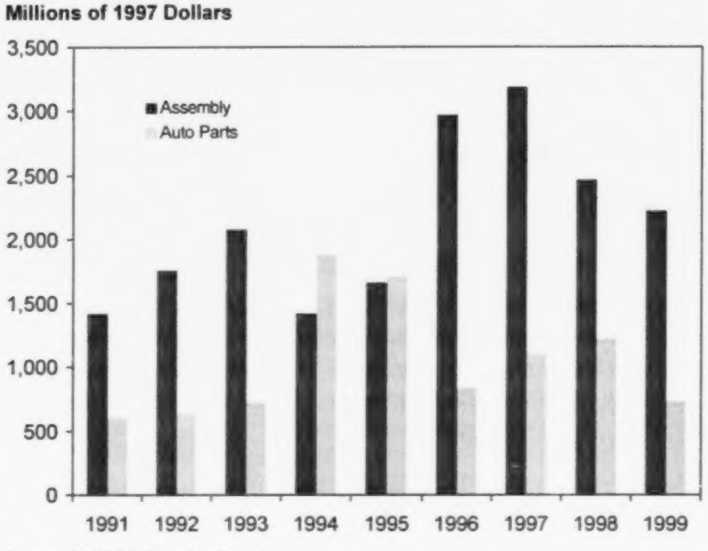
[34] The proportion of total investment accounted by sector, including the automotive sector, is not available for Mexico. Consequently, direct comparisons between the two countries are not possible on this basis.

[35] The amount of foreign investment in the Canadian automotive sector is not available. Consequently, direct comparisons between the two countries are not possible on this basis.

Figure 2.9: Capital Expenditures in Ontario Automotive Industry



Source: CANSIM, Statistics Canada

2.2 GOVERNMENT POLICIES

Canada and Mexico have generally similar trade policies. Both countries have sought to avoid U.S. protectionism, while at the same time increasing their trade activity with countries beyond the U.S. Nonetheless, the U.S. economy remains of considerable importance to both Canada and Mexico, and thus the importance of NAFTA. While NAFTA has not been the driver determining investment in one country or the other, it has been important in simplifying the investment process, particularly in Mexico. Mexico has also entered into a free trade agreement with the European Union.

Canada continues to be an increasingly open economy so that it ranks among the world's most open. Mexico has moved very quickly to become an open economy, and it may arguably soon surpass Canada in terms of its level of openness given the recent free trade agreement with the EU. Overall Mexican and Canadian corporate tax rates are also comparable, although tax rate reductions in Ontario will bring Canadian corporate tax rates in that province below Mexican general rates. In Mexico, the standard rate is 34%, regardless of source, while in Canada the combined federal and Ontario corporate tax rate on general manufacturing income is 34.1% today, and will be 29% in Ontario by 2005. The similarity between the two countries continues with respect to environmental policies, again with Mexico quickly catching up to North American standards on emissions and waste. Neither tax nor environmental policies appear to provide a strong competitive advantage for locating automotive investment in one country or the other.

The greatest difference between the two countries' government policies is with respect to labour and employment. The Mexican government takes a much more active role in labour laws that govern the relationship between employer and employee, frequently mandating the use of unions, such that unions are far more widespread in Mexico than in Canada. The benefits required to be included in most Mexican labour packages surpass those included in most Canadian labour agreements. However, the Mexican work week is typically longer than that in Canada by a full day and legislated vacation time is shorter. Also, despite greater unionisation in Mexico, there are far fewer strikes in Mexico relative to Canada.

Below we provide details on trade policy, labour and employment policy, and environmental policy.

2.2.A Trade Policy

Historically, Canada has been a far more open economy than Mexico. During the 1980s, however, Mexican trade policy shifted from an import-substitution model to one of trade liberalisation. This shift was marked by Mexico formally joining the General Agreement on Trade and Tariffs (GATT) in 1986, and was placed on an even firmer footing with the implementation of NAFTA on January 1, 1994. Canada, too, has pursued policies of increasing trade liberalisation over time. In the automotive sector, the most important developments have been the Auto Pact, the FTA, and NAFTA.

In addition to NAFTA, Mexico has bilateral trade agreements with nine Central and South American countries: Bolivia, Chile, Costa Rica, the Group of Three (Venezuela, Colombia, and Mexico), Nicaragua, the Central American Northern Triangle (Guatemala, Honduras, and El Salvador). In addition, Mexico is in the process of negotiating agreements with six more countries in the region. The Mexican government is actively supporting trade liberalisation within the Asia Pacific Economic Cooperation (APEC). As noted earlier, Mexico also recently concluded a free-trade agreement with the EU and with the European Free Trade Association. After incorporating the impact of Mexico's existing free trade agreements, it is estimated that the trade-weighted average external tariff in Mexico is 1.5%. This rate is somewhat higher than that of Canada, where the weighted-average external tariff was 0.9% in 1999.[36] Canada, too, has completed recent free trade agreements with Chile and Israel and is pursuing initiatives such as the Free Trade Agreement of the Americas (FTAA) and market liberalisation measures under APEC.

The value of Mexican exports and imports has almost tripled in the last decade, reaching $508.7 billion in 2000, 22.5% more than the previous year and growing at an annual rate of 15.6%. This figure places Mexico among the top 11 trading nations of the world, and the first in Latin America. Mexican exports represented 29.2% of Mexican GDP in 2000, while imports represent 30.6% of Mexican GDP. Canadian international trade has increased by an average rate of 8.6% over the last decade, reaching $346.5 billion[37] in 2000. In 2000, Canadian exports of goods and services represented 41.1% of GDP, while exports accounted for 45.8% of GDP.[38]

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[36] Department of Foreign Affairs and International Trade, Trade and Economic Analysis Division.

[37] An exchange rate of US$0.67=CDN$1.00 was used for both figures reported in the paragraph.

[38] Statistics Canada, National Income and Expenditure Accounts, Catalogue No. 13-001-XIB.

Sector-specific trade policies of relevance to the auto industry in Mexico and Canada are discussed in more detail below.

(i) Mexican Maquiladora Program[39]

The *maquiladora* program was established by the Mexican government in 1966 in order to help alleviate high unemployment in the border regions of Mexico and to attract foreign investment and technology to Mexico.

Since the program was formalized, this system of export incentives has evolved far beyond its original focus which was initially on in-bound temporary imports of machinery and inputs. Today, a *maquiladora* is a business whose operations are approved by the Ministry of Economy, under the terms of the "*Maquiladora* Decree" which establishes the following:

- *Maquiladora* firms can import materials and capital equipment free of duty and value-added tax, on a temporary basis for use in the manufacture of exported goods or to support those activities related to export.
- *Maquiladora* firms can be 100% foreign owned and have the right to employ foreign managers, technicians, and trainers.
- As of 2001, the full-duty drawbacks will be phased out completely and the *maquiladora*s will be able to sell up to 100% of their products in the domestic market, upon payment of duties on any in-bound inputs.
- *Maquiladora* enterprises can choose to locate anywhere in Mexico.
- *Maquiladora* enterprises have full access to the U.S. market under NAFTA while still taking advantage of in-bound incentives on sales to other countries.

While as of 2001, the division between the *maquiladora* sector and producers for the domestic market will cease to exist formally, it will be some time until the two sectors are in fact fully integrated.

(ii) PITEX, ALTEX, ECEX and PROSEC

PITEX supports the export-oriented industry through a system of duty exemptions for imported capital goods used in the production of exports.

ALTEX is designed to simplify the administration of duty exemptions and to streamline customs procedures for large-scale exporters. Participating companies must have annual exports of at least $3 million or must export 40% of total sales.[40] ALTEX benefits are currently being granted to *maquiladoras*.

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[39] Mexico, Secretariat of Economy.

[40] An exchange rate of US$0.67=CDN$1.00 was used for this figure.

The ECEX program is designed to promote the development of trading companies. The benefits include exemption from Mexican value-added tax for goods purchased for export. The program is available to wholesale and retail distributors. Participating companies are required to have annual exports of at least U.S.$2 million and to maintain a positive foreign trade balance.

The government has also implemented a new sectoral promotion program (PROSEC). Under this program, enterprises included in the approved list of sectors, can apply to qualify for reduced import duties (ranging from 0-5%) on machinery and inputs. Part of this program is to help integrate the *maquiladoras* into the domestic economy.

All of these programs to promote exporting industries are available to companies operating in Mexico regardless of the nationality of their ownership.

2.2.B Mexican Automotive Trade Restrictions

As noted earlier in the Overview section, assembly plants have been present in Mexico since the 1930s, with the beginning in 1962 signalling the government promotion of industrialisation through import substitution. At that time, the Mexican government's main emphasis was on transmission systems and engines, which remain a major segment of the automotive parts industry. The Mexican Auto Decree of 1977 further aimed at balancing the foreign exchange budget by increasing local content. This changed in 1989 when, under the new Auto Decree, the focus of government policy towards the auto sector shifted to rationalisation. The policy aim was to foster specialisation by reducing the number of models produced in Mexican plants. The government established national content and trade balance restrictions whose effect was to promote exports and intra-firm trade. To meet the new restrictions, automakers had to run a trade surplus.

The 1989 Decree also lessened protectionism in the automotive parts sector but maintained foreign investment and local content restrictions. Under NAFTA, Mexico has committed to reducing local content requirements from 36% in 1994 to 29% by 2003, with their full elimination set for 2004. The 2001 local content requirements are 31%. The gradual reduction in local content requirements and the prospect of their full elimination in 2004 has created business opportunities for non-Mexican suppliers. It is also forcing Mexican suppliers to bring product quality and cost performance to world-class levels if Mexican suppliers expect to maintain any significant business after 2003. Thus, those Mexican suppliers that remain following elimination of the local content requirements are expected to be able to meet the cost and quality targets demanded by export markets.

2.2.C Canadian Automotive Trade Provisions

The most notable feature of Canadian automotive trade policy has been the Auto Pact. Under this agreement, qualified motor vehicle manufacturers are able to import both vehicles and original equipment automotive parts, excluding tires and tubes, duty-free from any most-favoured country.[41] As described in Section 1, the Auto Pact is being phased out as of February 2001. Apart from Auto Pact and NAFTA, Canada's general open market position continues to hold with respect to automotive products. Canada's most-favoured nation tariffs on all automotive products have been steadily decreasing from 17.5% in 1965 to the current 6.1% on vehicles imported from Europe, Japan and Australia, and 6.0% for most auto parts (brakes, air bags, safety seat belts, brakes, cylinder and steering wheels).[42] [43] In addition, all NAFTA originating vehicles and parts imported from the U.S. may enter Canada duty-free. NAFTA auto parts originating from Mexico are also duty-free, while vehicles are subject to a 0.6% tariff. By January 1, 2003, all NAFTA originating vehicles imported from Mexico will be able to enter Canada duty-free.[44] Under NAFTA, duties on imported inputs used in the production of product that is subsequently exported may be remitted. The duty remitted is equal to the lesser of the duty paid on the imported input and the duty paid with respect to the finished good when it enters the U.S. or Mexico.[45]

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[41] "Section 2: Trade and Industry Policy Environment", APEC Member Economies, www.apecsec.org.sg/committee/auto/canada.html, at 2.

2.2.D Labour and Employment Policy

Perhaps contrary to general impressions, Mexican labour law is strict in its prevention of unsafe working conditions, in addition to regulating labour contracts, minimum wages, employee benefits and union activity within Mexico. Detailed descriptions of relevant provisions of Mexican and Canadian labour laws are provided in an Appendix to this report.

Common features of Mexican and Canadian labour laws include mandatory participation in public sector health insurance and retirement programs. Mexican labour law requires that all workers be enrolled in the public health system called the Mexican Social Security Institute (*Instituto Mexicano del Seguro Social, IMSS*). Employers are required to contribute an average of 17.42% of each worker's salary into the social security fund. Benefits include basic health care and medications, attention to occupational accidents and care for illnesses. Since the implementation of the Retirement Savings System (*Sistemas de Ahorro para el Retiro, SAR*) in 1993, employers must pay 2% of a worker's salary (up to 25 times the minimum wage) to a government-run retirement fund in a bank account under the worker's name. In Canada, employers must pay an employer provincial medical health tax: in Ontario, the employer provincial medical health tax varies from 0.98% to 1.95%, depending on the amount of the employer's annual payroll.[46] Both employers and employees contribute 4.3% of an employee's gross income to the Canada Pension Plan to a maximum of $38,300. There is a basic exemption of $3,500.

Both Mexican and Canadian laws mandate certain other employer payments. Under Mexican law, employers are required to pay a 5% fixed payroll tax to finance the National Fund for Worker

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[42] Canada Customs and Revenue, Claims and Sevices office (416) 973-1652. http://www.ccra-adrc.gc.ca/customs/general/publications/customs_tariff_toc2001-e.html

[43] A general tariff of 35% applies to all goods from countries that do not have the Most Favoured Nation status: Albania, Oman, North Korea and Libya (NAFTA Information Desk, Revenue Canada A Customs, Excise and Taxation, Claims and Services (416) 973-1652). A detailed table of tariffs is in an appendix to this report.

[44] "Section 2: Trade and Industry Policy Environment", APEC Member Economies, www.apecsec.org.sg/committee/auto/canada.html, at 3.

[45] Duties on imported inputs used in the production of product that is subsequently exported are fully remittable. Under NAFTA, this is now also the case for products that are exported to the U.S.

[46] OHIP office (905)-273-9490, (905) 275-2730. Changes to Ontario's Employer Health Tax at http://www.manulife.com/gb/groupben…les/htmllc-p-o.3/$File/lc-p-o.3.htm

Housing. Mexican law also requires firms to participate in a profit sharing program in which 10% of the firm's annual fiscal profits are set aside for distribution among most employees based on a formula considering the number of days worked, to pay a year-end Christmas bonus to all employees equivalent to at least two weeks pay (although most pay considerably more.) Canadian firms must pay unemployment insurance premiums of 2.25% of gross income up to the maximum amount of $39,000. The employer's contribution is 1.4 times that of the employee.[47] In addition, Canadian employers in many industries, including the automotive sector must contribute to Workplace Safety and Insurance Board (WSIB) insurance. The annual maximum insurable earnings are $60,600. Premiums for the auto sector range from $1.33 to $3.75 per $100 of gross wages.

Both Canadian and Mexican labour laws guarantee workers paid vacations (two weeks in Canada after one full year of employment; six days in Mexico after one year, rising to two weeks after five years, with an additional two days granted for each additional five years of service) and paid legal holidays.

As the previous paragraphs indicate, employment taxes to fund government programs and the costs of government mandated benefits are higher as a percentage of labour costs in Mexico than in Canada. Mexico also has stringent laws regulating worker dismissals that make it very difficult to dismiss permanent workers without incurring substantial severance payments. Mexican law also strongly encourages unionisation. Approximately 30% of the Mexican work force is unionised, a rate that is comparable to that for Canada overall. This level increases to 80% in industries where companies average 25 or more employees. Virtually all Mexican automotive facilities are unionised.

Other differences in labour practices between Mexico and Canada, however, tend to favour investment in Mexico. Despite high unionisation, employers seldom lose production to strikes. Although the Mexican constitution establishes the right of registered unions to strike, very few strikes actually occur. Strikes must be filed with the Federal Labour Conciliation and Arbitration Board *(Junta Federal de Conciliación y Arbitraje, JFCA)* to be deemed legal. If the JFCA does not grant permission to strike, employees have 24 hours to return to work or face termination. In addition, longer work weeks are typical in Mexico; the blue collar work force typically works a six-day, 48-hour work week, the maximum allowed by law.

Overall, while mandated benefits and payroll-based taxes are higher as a percentage of wage expenditures in Mexico than in Canada, partially offsetting lower Mexican wage costs, Mexican producers can benefit from longer work weeks and a labour force that, while extensively unionised, seldom resorts to strikes. On the whole, the institutional differences in labour laws are unlikely to make a large difference in investment location decisions as their effects on production costs are at least partially offsetting and are likely to be small in comparison with the very large difference in wage rates between the two countries.

2.2.E Environmental Policy

Environmental policies in Canada and Mexico are roughly comparable. However, there is some evidence that environmental regulations may not be as stringently enforced in Mexico. As noted in Section 5 of this report, industry participants we interviewed perceive that Mexican authorities tend to target foreign companies far more often than Mexican firms when investigating for environmental violations.

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[47] Canada Customs and Revenue Agency General Inquiries.

Since 1983, Mexican environmental laws have been administered by a specialised secretariat that is empowered to establish rules, criteria and procedures, issue permits and ecological technical standards and undertake environmental impact assessments for the purpose of preventing and controlling environmental pollution. Mexico's Ecology Law is divided into six titles which regulate the following areas: air pollution, hazardous waste, water quality, soil use and conservation, naturally protected areas, public participation, right to environmental information, land use, environmental impact assessments and noise. Mexican environmental laws, like those in Canada, include an extensive regime of industry reporting requirements, requirements for environmental impact assessments, and pollution control regimes for air, water, and waste management.

Of particular interest to automotive sector manufacturers are regulations on air and water pollution, which are described more fully below.

(i) Air Quality Control

With respect to air pollution, Mexico has implemented a number of maximum permissible limits (LMPs) for fixed source emissions from specific industries. The LMPs affecting the automotive sector are limits on volatile organic compounds for painting processes for new automobiles, trucks and passenger units. In addition, Mexico has established regulations governing new car emissions. To this end, a release verification process has been set up by both SEMARNAT and by the Secretariat of Economy. Manufacturers of new automobiles must ensure that their vehicles comply with the emissions, components and equipment standards set forth in these regulations, and new automobiles must be accordingly certified as compliant.

A number of industries[48] including the automotive sector must also obtain an operating licence from SEMARNAT prior to the start of operations. Although the licence is issued for an indefinite period, annual updates of the information submitted in the original application are required. The industries subject to these regulations are further required to release their emissions through chimneys or stacks. The total emissions limits for a plant with multiple stacks are the sum of all emissions from each of the individual stacks. Sampling platforms on the stacks and calibration of testing equipment must also be maintained as well as release monitoring and stack sampling.

In Canada, the provincial governments set air quality standards subject to the federal *Environmental Protection Act*. In Ontario, the Ministry of the Environment maintains a listing of more than 300 ambient air quality criteria (AAQC) and the corresponding point of impingement (POI) limits, with the listing available on request. AAQC are used for assessing general air quality and the potential for causing an adverse effect. POI limits are used primarily to review applications for certificates of approval for emissions to air and to assess compliance with Ontario regulations.[49] Ontario is in the process of developing new air quality standards for 70 priority pollutants. All new standards are subject to consultation with private sector stakeholders before they are implemented.[50] The air standards that most impact the automotive industry are those related to volatile organic compound (VOC) emissions from paint lines followed by nitrogen oxide, sulphur dioxide and particulate emissions from industrial boilers. With respect to nitrogen oxide and VOC, Ontario is committed to reducing these emissions by 45% of 1990 levels by the year 2015,[51] with the possibility of an earlier target date of 2010 contingent on the Canadian federal government successfully negotiating a commitment for equivalent reductions from the U.S.[52] With respect to nitrogen oxide and sulphur dioxide, the Ontario government is planning on introducing emission caps and trading. The caps would at first only apply to fossil fuel power plants but the program, including the trade in emission reduction credits, would eventually be expanded to more industries.

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[48] The chemical industry; the oil and petrochemical industries; the paint and ink industry; the automotive industry; the metal works industry; the glassworks industry; the electric power generating industry; the lime, cement and asbestos industries; and, the hazardous waste treatment industry.

In addition to current environmental standards, Mexico has subscribed to the Kyoto Protocol on emissions as has Canada. In order to address its Kyoto commitments, automotive firms in Mexico must undertake the following:

- Install pollution control equipment and systems;
- Set up a toxic release inventory;
- Monitor and report toxic releases to SEMARNAT;
- Monitor areas surrounding the facility when the facility is located in an urban or suburban zone, when it borders Natural Protected Areas or when, due to its operating characteristics or the raw materials, products or by-products used, the environment in which the plant is located may be exposed to severe damage;
- Maintain an operations and maintenance log of their processing and control equipment;
- Notify SEMARNAT prior to any operation commencement following scheduled shutdowns, and upon restarting operations after unscheduled shutdowns, where these may cause air contamination; and,
- Immediately notify the authorities of any control equipment breakdown so that SEMARNAT may respond appropriately.

As an "Annex B" country, the Kyoto Protocol would subject Canada to limits on its overall CO_2 emissions beginning in 2008. Mexico, by contrast, would not be subject to such limits. It is unlikely, however, that Mexican automotive sector can gain a significant competitive advantage over that of Canada from this difference in treatment under the Kyoto treaty. First, the recent rejection by the current U.S. administration of the entire Kyoto framework places the treaty's future very much in doubt. It is highly unlikely that Canada or any other country will in fact commit itself to limiting

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[49] "Setting Environmental Quality Standards in Ontario: The Ministry of the Environment's Standards Plan", at 6.

[50] "Setting Environmental Quality Standards in Ontario: The Ministry of the Environment's Standards Plan", at 8-9.

[51] "Notes for remarks by the Honourable Dan Newman, Minister of the Environment at the Toronto Smog Summit" June 21, 2000, www.ene.gov.on.ca/envision/news/0043s.htm, at 3.

[52] "Ontario: Addressing U.S. and Domestic Sources of Air Pollution", Ontario Fact Sheet, www.ene.gov.on.ca/envision/news/050201fact.htm, at 3.

CO_2 emissions unless the U.S. also agrees to similar limits. Second, even should Canada choose to limit CO_2 emissions, the effects of such limits on the costs of manufacturing (as opposed to using) motor vehicles should be quite modest so long as Canada relies on schemes, like tradable emissions permits, that would work to limit CO_2 emissions through changing the cost of energy. This is because, as noted in the section on electricity costs, energy costs represent a comparatively small fraction of total costs within the automotive sector, and even doubling or tripling them is unlikely to change the location of production within the industry.

(ii) Water Pollution Control

In Mexico, the National Water Commission is authorised, with the assistance of other involved secretariats, to issue water quality and wastewater discharge standards. Industrial, municipal, farming, wastewater and toxic discharges are subject to federal and state regulation. In addition, all discharges into rivers, sewage systems and other water reservoirs and water flows must meet the requirements set out in the applicable Official Mexican Standards (NOM), as well as the general conditions established for discharges. The NOMs provide mandatory sampling and monitoring procedures and are used for bringing administrative enforcement actions.

Besides the discharge standards under the NOMs, the National Water Commission may establish specific discharge standards for industrial facilities, known as "specific discharge conditions", which are set out in individual permits. The National Water Commission is required to take into account the NOMs, its own water classification system, third party rights to develop or use the receiving body of water, the restrictions imposed under the National Water Plan and other public interest or general health related issues, when establishing specific discharge conditions.

In Canada, water quality regulation, except in the case of federal waters, is determined strictly by the provinces subject to the *Canadian Environmental Protection Act*. Under this Act, the federal and provincial governments work to identify, assess and regulate toxic substances.[53] The provincial governments, subject to this Act and their own legislation, then define the legal limits for discharges to air and water for certificates of approval.[54] Environmental standards can be either numerical values (for example, the maximum allowable concentration of a contaminant in water) or narrative descriptions (such as the requirement that odour associated with treated drinking water be inoffensive).[55]

Ontario provincial water quality objectives (PWQOs) apply to surface water in the province and define the maximum desirable concentrations of chemicals satisfactory for aquatic life and recreation. Health of aquatic life is usually the driving consideration and in this case objectives are developed to protect the most sensitive life-stage for an indefinite exposure, with an added margin of safety. Socio-economic issues, such technical feasibility and cost, are not considered when developing PWQOs. These factors are considered during the application of the standards. PWQOs are applied on a case-by-case basis in the ministry's water management activities including the approvals process. The Ontario ministry has developed PWQOs for more than 240 chemicals and other polluting substances.[56]

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[53] "Acts Administered by the Minister of the Environment: Canadian Environmental Protection Act (1999)", www3.ec.gc.ca/EnviroRegs/Eng/SearchDetail.cfm?intAct-1001.

[54] "Setting Environmental Quality Standards in Ontario: The Ministry of the Environment's Standards Plan", www.ene.gov.on.ca/envision/env_reg/er/documents/2001/airstandards/pa9e0002.htm, at 1.

[55] "Setting Environmental Quality Standards in Ontario: The Ministry of the Environment's Standards Plan", at 3.

2.2.F Marketplace Framework

Recent trends in both Mexico and Canada have favoured a diminished role for the state in the economy and an increased emphasis on price stability. In Mexico, this trend has been especially dramatic, given the position from which it started. Two decades ago, the Mexican economy was heavily regulated and protected. Industries and services in many areas were shielded from foreign and domestic competition. The Mexican federal government operated thousands of enterprises in sectors ranging from hotels to transport and mining. Over the past 15 years, however, Mexico has expanded regulatory reform as a central element in a broad transformation from an inward-looking economy to an open and market-based economy.

Mexico was one of the first Latin American countries to adopt market-based principles as a cornerstone of economic development. Under the new model, macroeconomic stabilisation policies were supported by trade liberalisation and privatisation. Most state-owned enterprises, except in the energy sector, have now been sold, and opportunities opened for national and foreign investment in infrastructure. Virtually, all price controls have been eliminated. A government-wide deregulation program is promoting better regulatory techniques throughout the public administration, including state and municipal levels. A modern competition law adopted in 1993 created a framework for market-based principles, backed up by an effective watchdog. As a result, since 1995, Mexico has been characterised by strong growth in production, increased price stability, a strengthening of the banking system and a reduction in country risk, all occurring against a backdrop of considerable political effervescence.

Canada, by contrast, has always been a market-oriented economy, with the state exerting a relatively light hand in the economic sphere. In Canada, the federal and Ontario governments have generally been pursuing policies of tax cuts, deficit reduction and, through the Bank of Canada, inflation control. These policies in conjunction with a strong U.S. economy have produced a strong period of growth since 1994.

2.2.G Stability

Canada is viewed as an exceptionally stable and desirable environment in which to invest. Mexico's reputation, while not nearly the equal of Canada's, is improving. One important factor in this improvement has been Mexico's entrance into a multi-party system with the democratic election of a President from the traditional opposing party in 2000. Among a number of other factors, this change in the political structure has led Mexico to be seen as a more attractive place in which to conduct business.

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[56] "Setting Environmental Quality Standards in Ontario: The Ministry of the Environment's Standards Plan", at 15.

One line of evidence on market perception of stability is bond ratings on government debt. The government of Canada long-term credit ratings by Moody's Investor Service have been high over the last five years.[57] In particular, Canadian dollar debt has been rated AA1 in the period 1996-September 2000 and Foreign Currency Debt was given rating AA2 in 1996-June 2000.[58] Moody's Investor Service updated the Canadian Foreign Currency Debt rating on June 21, 2000 to AA1.[59] This upgrade was prompted by Moody's assessment that Canada's public sector financing and long-term competitiveness had improved. Ontario similarly receives high ratings by Moody's. Its long-term debt rating has been unchanged for the last five years at AA3. Mexico, by contrast, now enjoys long-term debt ratings by Moody's Investor Service of BAA for bonds and BA1 for bank deposits.[60]

Another line of evidence of perceived stability are the scores given the countries in the Economist Intelligence Unit (EIU) business environment rankings. For the forthcoming five years (2001-05), the EIU ranks Canada as the third best place out of sixty countries in which to conduct business.[61] This is an improvement over the previous period (1995-1999), when Canada was ranked fifth. While Canada's score in the overall business environment is very high (8.66 out of 10), the areas of taxation and the labour market continue to receive relatively low rankings. In the same global rankings, Mexico moved from 34th in 1996-2000 to 31st in 2001-2005.[62] In the regional ranking (out of eight Latin American countries)[63] Mexico moved up one place from third in 1996-2000 to second for the forecast period 2001-2005 (after Chile). The scores for the forecast period reflect an improvement in Mexico's macroeconomic environment, market opportunities and foreign trade rankings. These positive indices are based upon the prospect of a relatively smooth transition to a non-PRI government as well as the new administration's intention to pursue market-oriented policies with fiscal prudence.

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[57] Government of Canada Securities, Finance Canada on http://www.fin.gc.ca

[58] AA ratings are the second highest ratings awarded by Moody's. Together with AAA, AA rated bonds are considered high grade. They are rated lower than the best bonds because margins of protection may not be as large as in AAA securities of fluctuation or protective elements may be of greater amplitude or there may be other elements present which may make the long-term, risk appear somewhat larger than in the AAA securities.

[59] Finance Minister Welcomes Moody's Upgrade of Canada's Foreign Debt Rating, News Releases-2000, Finance Canada FTP Site http://www.fin.gc.ca.

[60] Bonds which are rated BAA are considered as medium-grade obligations. Interest payments and principal security appear adequate for the present but certain protective elements may be lacking or may be characteristically unreliable over any great length of time. Such bonds lack outstanding investment characteristics and in fact have speculative characteristics as well. Bonds which are rated BA are judged to have speculative elements; their future cannot be considered as well-assured. Often the protection of interest and principal payment may be very moderate, and thereby not well safeguarded during both good and bad times over the future. Uncertainty of position characterizes bonds in this class.

[61] EIU Country Forecasts, Canada, January 3, 2001, the Economist Intelligence Unit (EIU). The EIU uses its business-ranking model to measure the quality and attractiveness of the business environment in 60 countries. The following categories make up the overall position: political environment, political stability, political effectiveness, macroeconomic environment, market opportunities, policy towards private enterprise and competition, policy towards foreign investment, foreign trade & exchange controls, taxes, financing, the labour market, and the infrastructure.

[62] Mexico improved from 6.09 out of a possible score of 10 for the historical period (1996-2000) to 7.11 for the forecast period (2001-2005).

[63] The region's countries are: Mexico, Argentina, Brazil, Chile, Colombia, Ecuador, Peru and Venezuela.

Thus, while Canada remains a preferred investment location for investors requiring an extremely stable and relatively risk-free economic environment, Mexico is showing marked improvements in perceived risk and as a climate favourable to investment.

2.2.H Tax System

Tax rates are a notoriously difficult item to compare, given that general rates rarely tell the complete story, after taking various surtaxes, exemptions and deductions into account. Generally, corporate tax rates are similar in Mexico and Canada, although since fewer deductions can be made in Mexico, actual taxes paid in Mexico may at least in some instances be higher. Also, with further reductions in corporate taxes planned by Ontario, general corporate tax rates for automotive companies located in Ontario will be lower than in Mexico.[64] Sales taxes in the two countries are comparable. Personal income taxes are lower in Mexico. Below we summarise each country's corporate taxes, research and development taxes, personal taxes, sales taxes and property taxes. Details on each country's tax regime are provided in an Appendix to this report.

(i) Corporate Tax

The corporate income tax rate for resident and non-resident companies in Mexico is 34% of taxable income, a rate that is comparable to that for manufacturing in Ontario, where the combined federal and provincial corporate tax rate in Ontario is currently 34.1% for the manufacturing, processing, and resource sectors. Further cuts are expected to be phased in at both the federal and provincial levels in Canada so that by 2005 the general and manufacturing corporate tax rates will be 29%. As in Canada, the tax base of companies and individuals in Mexico is fully indexed for inflation.

Capital gains in Mexico are treated the same as regular income, and hence are taxed at the corporate rate. In Canada, corporate investment income and capital gains are not fully included in corporate income and hence are subject to a lower level of taxation. For the 2001 taxation year in Ontario, 62% of capital gains will be subject to income tax. By 2004, Ontario's inclusion rate will have decreased to 50%.[65]

There are no additional surtaxes in Mexico unlike Canada where there is a 4% federal corporate surtax that applies equally to manufacturers and other types of corporations, although Mexico does have a tax on assets that is not found in Canada. The tax on assets is charged at 1.8% of the average value of the company's (and individuals engaged in business activities') assets over the year.[66]

(ii) Research and Development Tax Incentives

Both Canada and Mexico have special tax treatment of research and development (R&D) activities, although Canada has a much larger number of special tax programs devoted to encouraging R&D.

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[64] By 2005, the general and manufacturing corporate tax rate in Ontario will be 29%.

[65] Tax Breaks June 2000, Deloitte & Touche, http://www.deloitee.ca/en/Pubs/tax/TaxBreaks/tb00-3.asp.

[66] There are also a number of Mexican government programs at the state that create incentives, including tax exemptions, for the promotion of new investments (see Appendix).

In Mexico, contributions to technology R&D funds are deductible if they are placed in an irrevocable trust with an authorised institution, if they do not exceed 1.5% of the contributor's revenues for the year, and if they are allocated solely to technology R&D programs and only expended on fixed assets related directly and exclusively to such programs. Contributions to funds for creating employee training programs are also deductible up to 1% of revenues obtained in the year, provided that specific requirements are met.

The Canadian federal government has one of the most generous R&D tax credit systems in the world.[67] Its basic structure was put in place between 1983 and 1985 and provides a variety of tax incentives mainly in the form of income tax deductions and investment tax credits for eligible current and capital expenditures.[68] Furthermore, for small Canadian-controlled private corporations, as found in the automotive parts sector, unused R&D tax credits are fully or partially refundable.[69] In addition to the federal R&D tax incentives, all the provincial and territorial governments provide income tax deductions for research and development and many provinces also offer various types of other R&D tax incentives mainly in the form of tax credits.[70] These are summarised in an Appendix to this report.

(iii) Personal Taxes

An individual resident in Mexico is liable for personal income tax on his or her world-wide income. Non-resident individuals are taxed on all their Mexican-source income, generally by way of withholding taxes. As a result of the use of withholding taxes, Canadian and Mexican personal taxes generally are not comparable. By way of example, however, an income of $93,230 would have $2,728 withheld in Mexican holding taxes and an additional $20,212 would be paid in Mexican personal income tax, for a total equivalent tax rate of 24.6% (see the Appendix for information on Mexican personal income tax rates and levels of withholding taxes).

Canada has a very progressive personal income tax system. Top marginal rates on salary and interest income range from 43.5% in NWT/Nunavut to 51.3% in British Columbia. The Mexican system is less sharply progressive. Personal business tax earnings are taxed at a fixed rate of 34%, and some special rates apply to income from prizes. In other cases, progressive rates apply. The table of progressive rates for the year is in effect compiled by adding together the twelve monthly wage withholding tax tables in force during the year (these tables are adjusted semi-annually to take into account the effects of inflation).

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[67] R&D Tax Incentives in OECD Countries: How Canada Compares, Conference Board of Canada, 1997 (as referenced in "The Automotive Competitiveness Review 1998: Industry-Identified Issues", Industry Canada, June 1998, at 5).

[68] "The Federal System of Income Tax Incentives for Scientific Research and Experimental Development. Evaluation Report", Finance Canada, 1998.

[69] "The Automotive Competitiveness Review 1998: Industry-Identified Issues", Industry Canada, June 1998, at 14.

[70] *The Federal System of Income Tax Incentives for SRED - Evaluation Report, Finance Canada* http://www.fin.gc.ca

2.3 SOCIO-ECONOMIC FACTORS

There continue to be stark differences between Canada and Mexico in terms of socio-economic factors particularly those related to poverty and the overall standard of living. The United Nations Human Development Index, which examines a country's achievements in three basic dimensions of human development – a long and healthy life, knowledge, and a decent standard of living – ranked Mexico 55th out of 174 countries while it has consistently ranked Canada as number one. Differences also manifest themselves in higher infant mortality rates in Mexico (24.9 per 1,000 live births in 2000 in Mexico compared to 6 in Canada in 1998). While it is impossible to compare crime statistics across the two countries, the general impression conveyed by the available information is consistent with the widely perceived view that crime is a far more serious problem in Mexico than it is in Canada.

With rapid and steady improvements in Mexico's GDP and government stability over time, socio-economic factors (with the possible exception of crime) have been improving in Mexico. These improvements are particularly manifest in education where Mexico has achieved high literacy rates and school enrolment. This is highly significant, since education is perhaps the most important of all socio-economic factors to potential investors, as the growing technological sophistication of much automotive production requires a literate and intellectually flexible work force.

Also important for investment, while the Canadian and Mexican judicial and political systems are different in their implementation, they are similar in their foundations of democracy and the independence of the judiciary. Below, we provide summary information on the Mexican legal system (we do not provide details on the Canadian legal system). For both Canada and Mexico, we provide crime and safety data, and information on health, education, and living conditions.

2.3.A Mexican Legal System

The basic structure of the Mexican government is a representative, democratic and federal republic. In contrast to Canada where, outside of Quebec, a common law system of precedent is used to guide decisions, the Mexican government is based on the ancient Roman system of codified law known as the "civil law" system. The Mexican civil system reduces the need for judicial interpretation. There are very few instances when, due to the lack of a specific provision in the law, the court is required to interpret the law and create a new rule. The executive branch creates law by issuing regulations and official standards, which implement existing legal provisions. The executive branch has also dominated the creation of new laws, through the tabling of proposed legislation before Congress (*Congreso de la Unión*).

The Mexican Constitution establishes areas of federal and state competency. In some areas, however, federal and local jurisdictions overlap. The coordination of federal and local efforts is achieved through guidelines established in the federal legislation and by compacts made between the various authorities. Federal laws are mandatory in the entire Mexican territory, while state and municipal laws are only binding in the issuing state or municipality involved. Regulations issued by federal executive authorities facilitate the understanding of and the compliance with the law. These include the internal administrative regulations issued by the federal secretariats and their executive officials. Official Mexican Standards (*Normas Oficiales Mexicanas, NOMs*) are specific measures and standards required by law, which are proposed by the different administrative secretariats in their corresponding area of jurisdiction and issued by the Federal Executive. NOMs are regulated under the Federal Law on Metrology and Normativity.

The Mexican legal system is generally considered to have been affected by corruption in both the judiciary and the law enforcement divisions of the executive branch. This corruption is at least in part attributable to a traditional lack of accountability in the Mexican political system. This, however, is beginning to change with the creation of new institutions designed to help ensure proper law enforcement. For example, a ministry designed to fight corruption within the government has been given increasingly more legal power and resources. The judiciary was also recently granted greater independence from government and a new federal police force was formed in 1999. Problems continue, however. The legal system can still be slow and ineffective, in part because of corruption but also because of structural problems. Most of the federal and state police forces are poorly trained, equipped and paid, and there are few incentives – economic or professional – for people in the judiciary to develop careers inside the branch. Despite these problems, poor law enforcement conditions have not tended to be a barrier to the investment and operation of large, foreign companies in Mexico.

2.3.B Crime/Safety

The data maintained in Canada and Mexico do not allow a direct comparison of crime rates. Mexican crime statistics measure the number of sentenced criminals, since most crimes are not reported to the police. Sentenced criminals per 1,000 inhabitants in Mexico in 1999 were 1.5. Canada, by contrast, measures the total number of crimes reported by police. In Canada, the number of reported crimes, referred to as the national crime rate, is the lowest in 20 years at a rate of just over 8,000 per 100,000 persons or less than 1%.[71] Clearly the number of sentenced criminals will be only a small fraction of the total number of reported crimes, particularly for property related crimes, where police have a very difficult time apprehending the culprit.

While we cannot directly compare crime levels in Canada and Mexico, we can report on trends. Unlike in Canada where crime has been declining, in Mexico between 1980 and 1999, the number of alleged and sentenced criminals increased by more than double. Anecdotal evidence would suggest that the crime rate in Mexico is much higher than in Canada and is on an upward trend as opposed to Canada's downward trend. Further support for this anecdotal evidence is found in each country's expenditures on its justice system. Canada's total spending on its justice system accounted for 1.3% of GDP in 1992-1993, dropping to 1.1% of GDP by 1997. This is considerably greater than the amount spent in Mexico, where spending on crime as a percentage of GDP was 0.2% between 1994 and 1997, increasing to 0.22% in 1998 and 0.24% in 1999 (see Figure 2.10).

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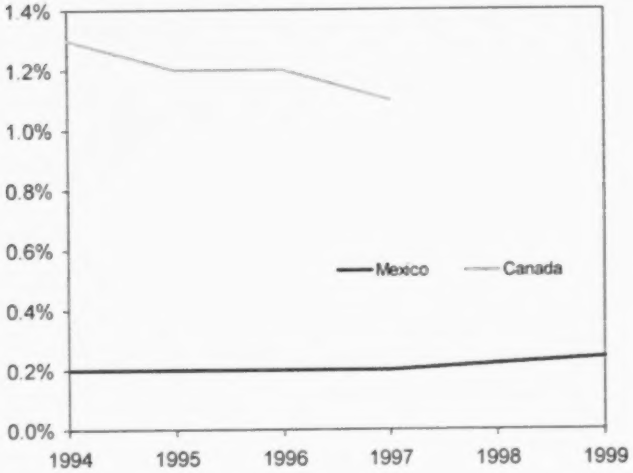
[71] Statistics Canada, The Daily, July 18, 2000 *Crime Statistics* as well as CANSIM.

Figure 2.10: Government Expenditure on Justice System in Canada and Mexico (% of GDP)



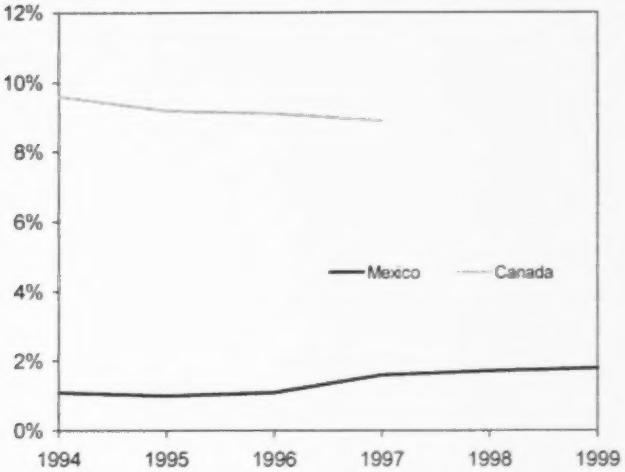
In the last years public safety has become one of the major concerns of the Mexican government. In 1998, the government implemented an eight-point strategy against crime, including provisions allowing for the acquisition of new crime prevention equipment and technologies and funding for public safety infrastructure development. The economic resources earmarked for this strategy were 12 times greater in 1998 than those designated in 1996.

Crime and the perception of personal safety is clearly an area in which Canada is tremendously advantaged relative to Mexico in the minds of potential investors. It is far from clear, however, that this difference represents a compelling reason for any potential investor to forego an otherwise favourable business opportunity in Mexico.

2.3.C Health

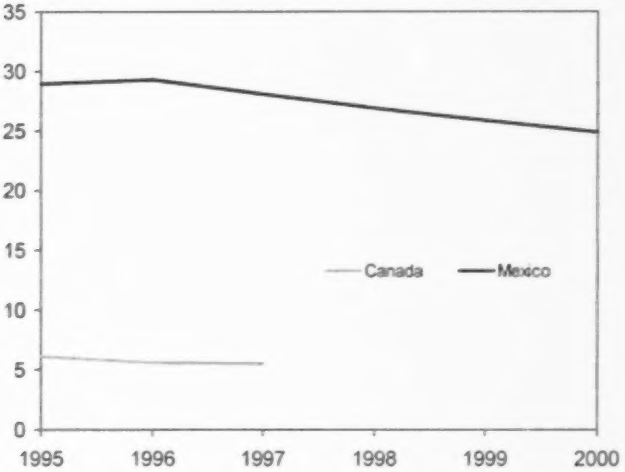
Unlike Canada's national public health care system, Mexico's national health system has both a public and a private component. Health care expenditure comprises a far smaller fraction of Mexico's GDP than it does in Canada. In Mexico, health expenditures as a percentage of GDP between 1994 and 1997 fluctuated from a low of 1.0% in 1995 to a high of 1.6% in 1997. In Canada, health expenditures as a percent of GDP declined over 1993-1997 – from 9.9% in 1993 to 8.9% in 1997 (see Figure 2.11).

Figure 2.11: Government Expenditures on Health in Canada and Mexico (% of GDP)



Among the most common indicators of health status are life expectancy at birth and infant mortality.[72] In 1998, life expectancy at birth in Mexico was 72.3 for both sexes, 77.6 for women and 73.1 for men. For comparison, in 1998, the life expectancy in Canada was 79.1, 81.9 for women and 76.2 years for men. In both countries, life expectancy at birth has improved considerably over the last few decades. Mexican infant mortality rates have also improved dramatically in a short period of time. The infant mortality rate was 29.3 per 1,000 live births in 1996, while in 2000, this rate had decreased significantly to 24.9. Canadian infant mortality rates have also improved dramatically from 19 per 1,000 live births in 1970, to less than 6 per 1,000 by 1998. Figure 2.12 presents infant mortality rates for both Canada and Mexico.

Figure 2.12: Infant Mortality in Canada and Mexico (Per 1,000 Live Births)



While the Mexican health care system is not as extensive or as advanced as that in Canada, and while health status in Mexico, as measured by infant mortality, lags that of Canada, these differences appear not to be so substantial as to seriously affect investment decisions. Mexican health standards are more than adequate to guarantee potential investors with a steady supply of healthy, productive labour.

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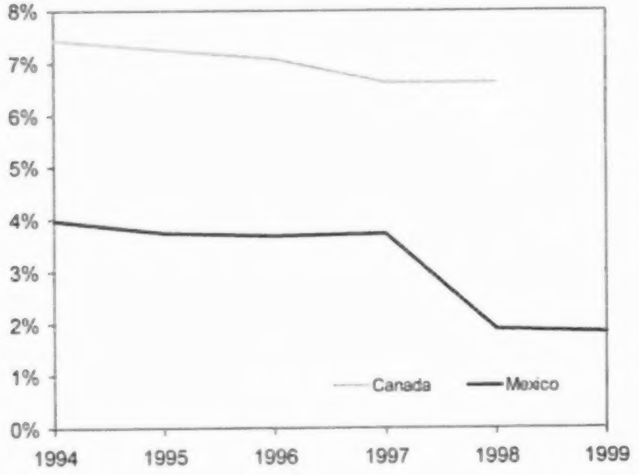
[72] Infant mortality refers to to the death of a live born infant within the first year of life. Stillbirths are not included in these calculations. Infant mortality rates are based on the number of infant deaths per 1,000 live births in any given year.

2.3.D Education

Canadian educational attainment as measured by literacy rates, enrolment statistics (primary, secondary and tertiary), and spending on education are consistently high. Canadian adult literacy rates were 99% in 1998. In Mexico, the adult literacy rate (age 15 and above) stands at 90.8%. Canadian public education expenditures constituted 6.9% of GDP in each year between 1995 and 1997 and represented 12.9% of total government expenditures in 1995-1997.[73] In Mexico, expenditures on education as a percentage of GDP declined from 4% in 1994 to less than 2% in 1998 (see Figure 2.13).

Figure 2.13: Government Expenditure on Education in Canada and Mexico (% of GDP)



Like Canada, the Mexican education system is made up of three levels. The definitions of these levels differ somewhat from that used in Canada. Basic school consists of pre-school, primary (6 grades) and secondary (3 grades) schools. The medium level consists of three years of preparatory or technical school. The superior level is made up of universities. Per capita enrolment levels in educational institutions are lower in Mexico than in Canada. It is estimated that 90% of Mexican 5 year-olds and 93.6% of Mexican children between the ages of 6 and 14 attend school. In comparison, the Canadian primary school enrolment ratio was 99.9% in 1997. Although school enrolment lags that in Canada at all levels, it is steadily rising. In 1998, approximately 85% of registrants finished the primary school cycle, 10% more than had finished in 1994, and the proportion of the 13-15 year old population registered in secondary school has grown from 71% in 1994 to almost 78%. In 1998, registration in preparatory or technical schools in Mexico was 2.7 million, which represents an increase of 4.1% from the previous year. Of these students, 58% were registered in preparatory school and 42% in technical and technological schools. At the university level, registration has grown at average annual rate of 6.6%. The Mexican university system includes 36 technical universities where over 22,000 students were registered in 1998-99. Of these students, 75% were studying engineering and other technical areas, and 25% were in economic/administrative areas.

These statistics illustrate that while it will be quite some time before Mexico fully closes the educational gap with Canada, the Mexican education system is increasingly capable of producing the literate workers demanded by the automotive industry. Moreover, Mexican capabilities in producing engineers and other technical workers needed to support automotive production is steadily improving.

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[73] Human Development Report 2000.

2.3.E Living Conditions

As noted above, Mexico is considerably lower ranked than Canada in terms of living conditions. Canada has consistently been ranked number one by the United Nation's Human Development Index (HDI). HDI is a composite index containing three variables: life expectancy at birth, educational attainment (adult literacy and the combined gross primary, secondary and tertiary enrolment ratio) and GDP per capita. Income represents a proxy for a decent standard of living and a surrogate for all human choices not reflected in the other two dimensions.[74]

A 1998 human poverty index ranks Mexico 12th among developing countries (after Uruguay, Costa Rica, Cuba, Chile, Trinidad and Tobago, Fiji, Jordan, Panama, Bahrain, Guyana and Colombia). Approximately 8.2% of Mexicans are not expected to survive to age 40 (9.2% of people in Canada were not expected to survive to age 60), adult illiteracy is measured at 9.2%, 15% of the Mexican population does not have any access to safe water, 9% of the Mexican population does not have access to health services, 28% of the population does not have access to sanitation, and 14% of Mexican children under age five are underweight.

In terms of equality indicators, the poorest 20% of Mexico's population account for 3.6% of total Mexican income, while the richest quartile's share is 58.2%. About 18% of the population lives below the poverty line. In comparison, between 1987 and 1998, the poorest 20% of the Canadian population accounted for 7.5% of total income and the top quartile accounted for 39.3% of total income.

Of the differences between Canada and Mexico noted above, perhaps the most significant for the future of automotive investment in Mexico is the relatively less equal distribution of income in Mexico. The existence of large domestic car markets requires the existence of a large domestic middle class. Canada's high level of national income and relatively equal distribution of income thus favours widespread vehicle ownership. Should income growth in Mexico be too narrowly targeted at the wealthiest individuals, automotive demand in Mexico may not grow as fast as it did historically in other countries at roughly Mexico's state of economic development that had relatively flatter income distributions.

2.4 CAPITAL

Canada is a much more capital-intensive economy than Mexico, reflected in general manufacturing and in particular in the automotive sector. In this section, we provide summary statistical information on technology, capital investment, and capital availability and costs.

In general, Canada leads Mexico in terms of both R&D expenditures and gross capital investments. Both countries, however, had similar capital availability as measured by lending by private financial institutions. Canada's expenditures on R&D as a percentage of GDP were more than three times that of Mexico's in 1999. Canada's annual gross capital investment growth rate has been greater than that of Mexico running at 17% since 1996 while for Mexico over the same time period the rate was just over 11%. Canada's and Mexico's financing to the private sector as a percentage of GDP is comparable with both countries running at over 11% (the Canadian rate is likely somewhat underestimated as it is based only on lending by major Canadian banks in 2000).

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[74] Human Development Report 2000.

2.4.A Technology

Mexico's economy can be characterised as a dual structure: a modern sector with a small number of large corporations with top-of-the-line technology and a traditional sector with a large number of technologically backward smaller companies. The net result is that there is a pronounced dispersion in the productive efficiency among corporations and economic sectors. In general, Mexican technological infrastructure is not well developed. The public or private centres dedicated to research and development are scarce in relation to the level of economic development within the country. National expenditures on science and technology are about 0.5% of GDP. Of this national expenditure, the private sector's contributions are low, reaching only one-fifth of the total. The standard private sector contribution to total science and technology expenditures in developed countries is between 50% and 70%.

In Canada, gross domestic expenditures on R&D in 2000 were $16.6 billion, a 5.4% increase over 1999.[75] This expenditure as a percentage of GDP at 1.64% in 1999 is more than three times greater than Mexican R&D expenditures as a percentage of GDP. While high relative to Mexico, however, in comparison to G7 countries, Canada's expenditures on R&D as a percentage of GDP are very low, ranking only ahead of Italy.

Automotive-specific technology initiatives in both countries are discussed below in Section 2.6. In general, both countries possesses enough technological sophistication to support virtually any automotive manufacturing activity. While Mexico possesses less technological infrastructure, this relative disadvantage has not been cited as a significant competitive disadvantage in investment decisions by any of the auto industry participants that we have interviewed.

2.4.B Investment

We have already touched on a number of investment trends in Section 1. Since 1993, Mexican gross capital investment has grown 37.8%. This is particularly significant when one considers that during 1995 total capital investment dropped almost 30% due to the *tequila* crisis of 1994. Since 1996, the annual growth rate of gross capital investment has been more than 11%. In comparison, in Canada, the annual growth in gross capital investment has been more than 17% (see Figure 2.14). This rate of growth is similar to Mexico's rate of growth in machinery and equipment investments. Except for 1995, when the growth rate fell 28.5%, investment in machinery and equipment has been growing at an annual rate of 17% since 1994.

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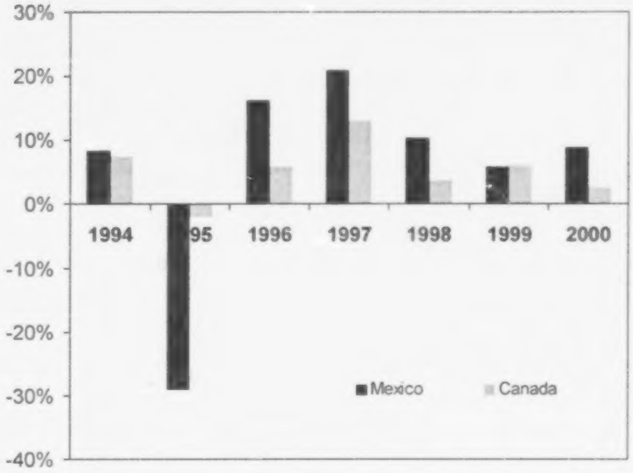
[75] "Science Statistics", Catalogue 88-001-XIB / ISSN 1209-1278, Statistics Canada.

Figure 2.14: Growth Rate in Gross Capital Investment



With the opening of the Mexican economy to greater trade, the variety of capital inputs available to producers has increased considerably which in turn leads to increases in the productivity of capital. As a result, NAFTA has induced capital productivity growth by both permitting better access to imported quality intermediate inputs and machinery, and increasing the pressure on exporting firms to produce at prices and qualities that can compete in world markets.

2.4.C Availability and Costs

As discussed earlier, Mexico has experienced several economic crises during the 1980s and 1990s. In 1982 the crisis was so severe that the government expropriated all banks, such that private sector credit became scarce and expensive. In 1986, oil prices fell thereby deepening the economic crisis. It was not until 1990 that the Mexican financial system started its recovery. In 1994, financing granted by the banking system to the private sector reached $150 billion[76] or 48.6% of Mexican GDP that year. The proportion has declined considerably since the mid-1990s following the 1995 exchange rate shock. In 2000, financing to the private sector was 11.7% of GDP in 2000.

Authorised business lending by major Canadian banks is also quite volatile. Over the last four years, it ranged from a low of 11% of GDP for the first three quarters of 2000 to a high of 28% in 1998. In general, however, most large multinational firms contemplating automotive investments in Mexico or Canada can obtain funding from their usual internal or external sources of funds and are not especially constrained by the availability and cost of capital in the Mexican market.

2.4.D Labour

The flip side of Canada being a more capital-intensive economy than Mexico, is that Mexico is much more labour-intensive. In this section, we provide summary statistical information on labour skills and training initiatives, labour relations/unions, wages and benefits, turnover and recruitment, and labour productivity. While we provide general information, our focus is in respect of the automotive sector.

In summary, a historical key comparative advantage of the Canadian automotive industry is its highly educated work force. In terms of availability of skilled workers, in 1997 Canada ranked third after Germany and France among world automotive-producing countries. Mexico ranked tenth out of the ten countries for which information is tracked.[77] Since 1997 this advantage has eroded with the increased availability of skilled workers in Mexico.

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[76] An exchange rate of 0.73 was used.

As noted earlier, the rate of unionisation in the Mexican automotive sector is almost 100%. The rate of unionisation is lower in Canada; while the vast majority of assembly workers are unionized, only about 40% of workers in parts manufacturing are represented by unions. Overall, the Canadian automotive sector is 60% unionized. Despite extensive unionisation, the Mexican industry is characterised by fewer person days lost to strike and relatively flexible labour relations. Union negotiations in Mexico are typically confined to economic issues such as wages and benefits; unlike Canada, union contracts do not contain restrictions on job classifications or prescribe work rules.[78] In addition to these benefits is the considerably lower cost of labour in Mexico.

The cost of labour in Mexico for assembly workers is approximately 20-25% of that in Canada when all benefits are included. Turnover tends not to be problem in either Canada or Mexico for the type of automotive manufacturing that is carried out in both countries, i.e. vehicle assembly and sophisticated parts manufacturing. (Firms in these sectors typically offer relatively generous compensation packages in order to retain their labour force.) In Mexico, some observers have, nonetheless, reported high turnover in low wage, labour-intensive assembly of such products as wiring harnesses.

With respect to productivity, Canadian plants are generally in the upper half of North American plants in terms of various measures of productivity, while Mexican plants are generally near the bottom by most such measures. It would be a mistake, however, to draw from this any conclusions that Mexican labour is inherently less productive than Canadian labour. The lower productivity seen in Mexican plants is in part accounted for by the relatively small scale of certain Mexican plants (e.g., the Lago Alberto DaimlerChrysler and the Cuautitlan Ford assembly plants). More importantly, it may also often reflect a deliberate choice by manufacturers to take advantage of lower Mexican labour costs by substituting labour for capital. In many areas, Mexican plants may utilise simpler and more flexible low cost assembly lines with below average levels of automation rather than the more highly automated systems commonly seen in Canada.

2.4.E Skills and Training

A key comparative advantage of the Canadian automotive industry is its highly educated work force. In terms of availability of skilled workers, in 1997 Canada ranked third after Germany and France among world automotive-producing countries. Mexico ranked tenth out of the ten countries for which information was tracked.[79] The Canadian Auto Workers (CAW) estimates that skilled labourers account for 12%-16% of workers at Big Three assembly plants but for around 26% of Big Three plants devoted to the production of components, such as engines.[80]

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[77] "The Automotive Competitiveness Review 1998: Industry-Identified Issues", Industry Canada, June 1998, http://strategis.ic.gc.ca/SSG/am01165e.html, at 12. The ranking of the ten countries in ascending order were as follows: Germany, France, Canada, Korea, Italy, Japan, U.S., U.K., Brazil, and Mexico.

[78] Provisions of the contract negotiated at VW of Mexico's Puebla plant in 2000, for example, include a 21 percent increase in compensation divided among increases in wages, productivity incentives, loans, and aid for school supplies for workers' children. VW workers staged a strike during contract negotiations, but after five days federal authorities declared the strike illegal and the workers returned to work.

In addition to informal, on-the-job training, extensive formal worker training programs are available in both Canada and Mexico. In Canada, the normal fashion in which workers obtain qualifications as skilled tradespeople is through combined college and apprenticeship programs. Apprentices learn a skilled trade by combining college courses with paid on-the-job training. Individuals work with a qualified tradesperson until they pass the required exams and have spent the required amount of time learning at work. Apprentices then earn a journeyperson Certificate of Qualification (or "ticket") that allows them to work at a higher rate of pay.[81] Most Certificates of Qualification are only applicable in the province it was received, however, holders can write certification exams for other provinces.[82]

In addition to college and apprenticeship programs, there are a number of industry, educational institutions, and government joint initiatives underway to help assure the ability of the labour force to meet new challenges and to further assure a continued supply of labour in all relevant trade areas. These include the Windsor Experiment, an initiative of DaimlerChrysler Canada, a key program of which is the Automotive Manufacturing Skills Initiative (AMSI).[83] In addition, many associations have launched promotional campaigns to make students more aware of the automotive industry and of the many skilled job opportunities that exist within the sector.[84]

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[79] "The Automotive Competitiveness Review 1998: Industry-Identified Issues", Industry Canada, June 1998, http://strategis.ic.gc.ca/SSG/am01165e.html, at 12. The ranking of the ten countries in ascending order were as follows: Germany, France, Canada, Korea, Italy, Japan, U.S., U.K., Brazil, and Mexico.

[80] Discussion with CAW.

[81] "Apprenticeship Training", George Brown College, www.gbrownc.on.ca/marketing/FTCal/apprent.html, at 1.

[82] "What is Apprenticeship?", Ministry of Training, Colleges and Universities, www.edu.gov.on.ca/eng/training/apprenticeship/whatisappren.html, at 2.

[83] The AMSI involves automotive companies (DaimlerChrysler, Sulvay Automotive, Siemens Electronics, Kapco Tool & Die Ltd., MCS/Aerotech Design International, MTE Controls & Hydraulics, CenterLine (Windsor) Ltd., Collins Electric Service Ltd., and Lamb Technicon), a technical college, the CAW, and Industry Canada. The program was designed for under- or unemployed Canadian youth to gain skills in industrial electronics, electronics engineering, industrial mechanics (millwrighting), and mechanical engineering. The program involves both in-class training and two days of work at one of the participating companies. To qualify, applicants must be employed registered apprentices and have a high school diploma that includes specific courses. Upon completion, graduates normally earn Electronics Technician or Electronics Technology diplomas.

Like Canada, the Mexican government offers training for labour through two kinds of institutions: Industrial Labour Training Centers (CECATI) and the National College of Professional Technical Training (CONALEP). The services are also provided at the request of enterprises or to support programs such as training scholarships, offered by the Labour Secretariat. The demand is concentrated in specialties such as automotive maintenance, electricity, electronics, computer operation, and machinery and tools. The courses are mainly practical and closely linked with the requirements of the labour market. There are more than 160 Technical Link Committees with industry, which provide information about training requests in certain regions and states. There are, also, more than 50 mobile units that develop training actions directed to rural and marginal urban areas.

Additionally, there are other institutions (public and private) providing regional technical educational services at the college and graduate levels (BA, MA), as technological state universities or institutes

2.4.F Labour Relations/Unions

The CAW is the largest union operating in the Canadian automotive sector with over 49,500 members. All of the Big 3 and CAMI (a GM and Suzuki joint venture) have master contracts with the CAW. GM is the largest CAW employer, accounting for 43% of membership, while DaimlerChrysler accounts for 29%, Ford 23% and CAMI for just over 4%. Of CAW members, 70% work in assembly facilities and 26% work in in-house parts and component facilities. Just 3% work in parts depots, with the remainder in other operations, including security and office workers. All CAW contracts last three years.[85]

Total unionisation of Canadian auto assembly is declining. In 2000, unionised workers accounted for 60.6% of industry workers as compared to 70.1% in 1997 (see Table 2.2 below). This is largely attributable to the growth of Japanese auto manufacturers which tend not to be unionised.

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[84] One of the largest joint training initiatives is that of the Canadian Automotive Repair and Service (CARS) Council, a collaboration of employers, employees, government and educational institutions. This initiative was formed in 1988 to address human resources development in the auto repair and service industry. While this is an aftermarket service, many of the skills learned in these programs are applicable to automobile production.

[85] "1999 Collective Bargaining and Political Action Convention", Canadian Auto Workers, www.caw.ca/99convention/sa_majorauto_sector.html, at 1.

Table 2.2: Motor Vehicle Parts Manufacturing - Estimated Number of Employees by Establishment Size, by Union and Non-Union Coverage (thousands)

Establishment size		1997	1998	1999	2000
Total	Total	89.3	90.3	101.7	102.5
	Union coverage	62.6	58.9	63.8	62.1
		(70.1%)	(65.2%)	(62.7%)	(60.6%)
	No union coverage	26.6	31.4	37.9	40.4
		(29.8%)	(34.8%)	(37.3%)	(39.4%)

Note: Motor Vehicle Manufacturing as defined above is the sum of NAICS # 3361 (Motor Vehicle Manufacturing) and NAICS # 3362 (Motor Vehicle Body & Trailer Manufacturing).
Source: Labour Force Survey, Statistics Canada.

Union coverage of parts manufacturers, where unions traditionally account for less than 45% of workers, has not exhibited this decline. In 2000, the percentage of parts workers who were unionised was 40.8% compared to 41.9% in 1997 (see Table 2.3 below).

Table 2.3: Estimated Number of Employees by Establishment Size, by Union and Non-Union Coverages (Annual Averages from 1997 to 2000 (thousands))

Establishment size		1997	1998	1999	2000
Total	Total	98.1	102.7	124.6	136.7
	Union coverage	41.1	46.2	49.9	55.8
		(41.9%)	(45.0%)	(40.0%)	(40.8%)
	No union coverage	57.0	56.5	74.8	80.8
		(58.1%)	(55.0%)	(60.0%)	(59.1%)

Note: Motor Vehicle Parts Manufacturing as defined above corresponds to NAICS # 3363. In other parts of this report, Motor Vehicle Parts Manufacturing is the sum of NAICS # 3363 (Motor Vehicle Parts Manufacturing) and NAICS # 326193 (Motor Vehicle Plastic Parts Manufacturing). However, these data are not available for NAICS # 326193.
Source: Labour Force Survey, Statistics Canada.

Despite Mexico's high level of unionisation, automotive employers generally enjoy more flexibility in utilising their work force than do employers in Canada, since Mexican unions typically are far more concerned with wage and benefit issues than they are with imposing work rules or enforcing job classifications. As a result, the Mexican labour force is generally much more willing to adopt flexible methods of production than in Canada. Consequently, unionisation has not presented a barrier to investment in Mexico.

2.4.G Wages and Benefits

Labour costs represent an obvious comparative advantage for Mexican automotive producers. While wages have been increasing by about 8.5% annually in Mexico in the automotive sector since 1985, wages for assembly workers only reached $17,846 annually in 1998.[86] This corresponds roughly with the total labour cost (wages and benefits) of $10/hour cited by Big Three sources in interviews conducted by CRA. In the Mexican auto parts sector, annual wages in 1998 were $9,397, about half the level in Mexican assembly plants, reflecting the lower skill levels. In comparison, the average yearly wage or salary for a production worker in Ontario's automotive industry (assembly and parts) was $47,286 in 1998, with assembly workers commanding $59,395.[87] If we include the mandated benefits discussed herein (social security, employee housing and retirement funds for Mexico, and unemployment insurance, OHIP, Canada Pension Plan and WSIB for Canada), the comparable figures are annual wages plus mandated benefits costs of $22,203 for an assembly worker in Mexico compared to $64,715 in Canada, and $11,697 for a parts worker in Mexico compared to $51,879 for a parts worker in Canada.[88] Thus, annual wages plus mandated benefits in Mexico for assembly workers are approximately 34% of Canadian levels and for parts, they are approximately 23% of Canadian levels.

Although wages in Mexico are relatively low, employee benefits add to labour costs. Those benefits required by government are noted above. In addition to these, some companies provide additional private health insurance plans and other benefits.

As indicated above, whether in Canada or Mexico, wages of assembly workers are higher than in other manufacturing industries. In the case of Mexico, wages of assembly workers are about twice the average for the Mexican manufacturing sector as a whole, which has resulted in low absentee levels and low turnover in assembly generally. Table 2.4 below compares wages in the Mexican automotive sector as a percent of average manufacturing wages.

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[86] INEGI, Economic Information Data Bank.

[87] "Manufacturing Industries of Canada: National and Provincial Areas," Statistics Canada, catalogue 31-203 XPB.

[88] Benefits in both Canada and Mexico are estimated by applying mandated benefits as outlined in Section 2.2.D of this report. Other benefits, such as additional health benefits, are not included.

Table 2.4: Wages in the Mexican Automotive Sector as a Percent of Average Mexican Manufacturing Wages

	Assembly	Auto Parts
1988	246%	115%
1989	226%	111%
1990	226%	105%
1991	216%	108%
1992	234%	100%
1993	212%	102%
1994	217%	102%
1995	208%	103%
1996	188%	106%
1997	199%	106%
1998	199%	105%

Source: INEGI, Banco de Información Económica

In Ontario, the 1998 average yearly wage for a production worker in the automotive sector amounted to $46,852 (1997 dollars) compared with $36,906 (1997 dollars) for a production worker in all manufacturing industries. In Ontario, automotive production workers accounted for 17.8% of production workers in all manufacturing sectors and commanded 22.5% of wages and salaries paid to production workers in all manufacturing industries.

Canadian assembly workers have also experienced the largest percent increase in their incomes in recent years. Between 1992 and 1998, the real income of assembly plant production workers increased by 2.5% a year in Canada and 3.2% in Ontario, compared to the rate of increase 2.0% in Canada and 2.1% in Ontario for auto parts production workers. By comparison, manufacturing sector workers in Canada generally saw their real incomes increase at a rate of 0.4% per year. For Ontario, the real annualised increase over the 1992-98 period was 0.9%. Consistent with the above-average growth in wages in both segments of the Ontario automotive industry is the claim by Industry Canada that demand for skilled workers has been recently outpacing supply.[89]

The fact that incomes of auto parts workers have not increased as fast as assembly workers seems to indicate that the increase in demand for auto parts workers has been accompanied by a commensurate increase in supply, while assembly plants appear to have chosen instead to increase their use of overtime. In Canada, unionised auto assemblers are generally reluctant to increase employment in response to cyclical surges in demand given the substantial job protection guarantees embodied in current union contracts.

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[89] *Automotive Competitiveness Review*, 1998.

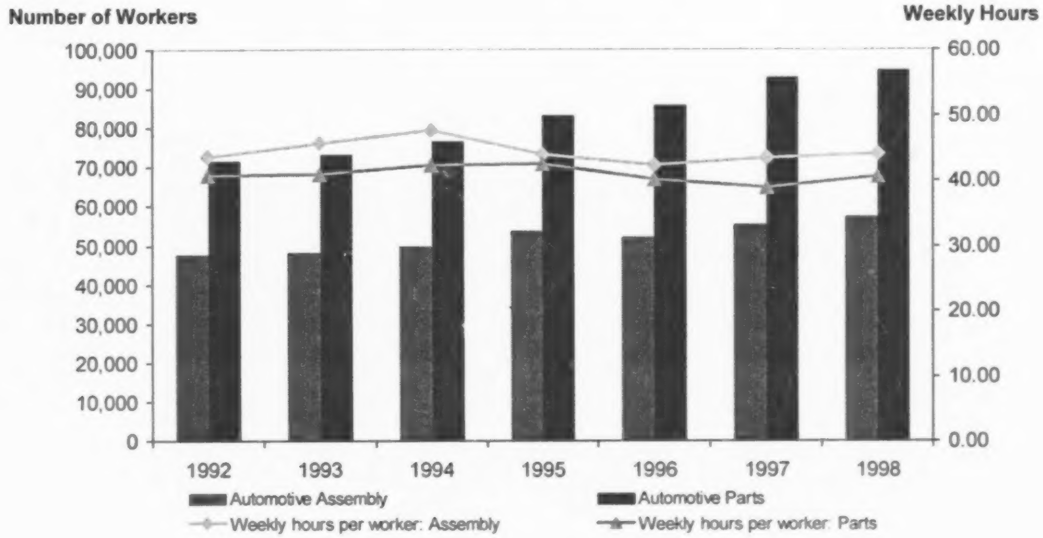
2.4.H Turnover/Recruitment

Turnover can be a problem in some regions and some firms within Mexico. While there are no official statistics, some observers mention turnover rates as high as 20% a month in some *maquiladoras* in the border region with the U.S. It seems, however, that these high rates are confined to factories that use very low-skilled labour to carry out particularly labour-intensive activities like, in the case of the automotive industry, the production of wiring harnesses. These factories tend to pay quite low wages. In instances where Mexican firms have introduced human resource retention programs, turnover rates have fallen precipitously. Some observers have indicated that in other areas closer to the centre of the country turnover rates can be as low as 1% a year.

Mexican labour markets are regionally fragmented, and labour recruitment has been identified as an important issue in some of the traditional centres of the Mexican automotive industry in which the supply of locally trained labour has become tight. Some employers report difficulty, for example, that they increasingly must rely on workers born outside the area in order to fill positions in the Siltillo/Ramos Arizpe area, negating one of the reasons for locating plants in that area in the first place.

Turnover and recruitment have historically not been significant issues in Canadian automotive manufacturing. The number of workers in Ontario assembly plants has remained relatively constant while the number of workers producing auto parts has been steadily increasing (see Figure 2.15). On the other hand, average hours per worker per week have remained high in assembly plants but have decreased in parts manufacturing.

Figure 2.15: Number of Production Workers and Weekly Hours of Work in the Ontario Automobile Industry



Source: Statistics Canada, Manufacturing Industries of Canada: National and Provincial Areas, Catalogue No. 31-203.

That being said, the Canadian automotive industry may be facing a critical labour shortage. The APMA reports in an Industry Canada study that the sector will require as many as 30% more skilled tradespeople and technologists over the next decade as a large portion of the automotive labour force retires.[90] The key trade areas in which shortages are anticipated are general machinists, tool and die makers, mouldmakers, millwrights, and industrial electricians.[91] The APMA found that these critical skilled trades constitute about 8% of the industry's work force.[92]

2.4.1 Productivity

While it is difficult to compare labour productivity between Canada and Mexico across all of the segments of motor vehicle industry, some general conclusions can be drawn from the detailed plant-by-plant productivity assessments contained for the assembly, engine, and stamping sectors provided in the *Harbour Report*. (These productivity differences will be addressed at greater length in Section 3, which provides competitive assessments of the Canadian and Mexican industries in all three sectors.) In all three sectors, Canadian plants are very productive relative to both their U.S. and Mexican counterparts.

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[90] Industry Canada, June 1998, http://strategis.ic.gc.ca/SSG/am01165e.html, at 6.

[91] Industry Canada, June 1998, http://strategis.ic.gc.ca/SSG/am01165e.html, at 23.

[92] Industry Canada, June 1998, http://strategis.ic.gc.ca/SSG/am01165e.html, at 23.

As one example of this trend, we present data on hours per vehicle drawn from the 2000 edition of the *Harbour Report*. The report measures productivity based on hours per vehicle, where hours are defined as all hourly and salary hours that are paid, except for overtime.[93] Included in total hours are downtime, paid lunches, breaks and meetings. A distinction between plants in launch in 1999 is also made.[94] The productivity index is then simply the ratio of total hours to total vehicles produced. The rankings of Canadian and Mexican car assembly plants are contained in Tables 2.5 and 2.6 below.

Table 2.5: Hours Per Vehicle Ranking of Canadian and Mexican Car Assembly Plants

Plant	Market Segment	North American HPV Ranking
Canada		Out of 39
Toyota Cambridge N.	Subcompact	3
Ford St. Thomas	Large	6
GM Oshawa #2	Midsize	7
GM Oshawa #1	Midsize	8
Toyota Cambridge S.	Compact	15
DCX Bramalea	Midsize	23
GM Ste. Therese	Sports Car	26
CAMI Ingersoll	Subcompact	27
Mexico		
Ford Hermosillo	Subcompact	29
GM Ramos Arizpe	Subcompact	31
DCX Toluca	Compact	37
Ford Cuautitlan	Compact	39

Source: *Harbour Report*, 2000

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[93] Given that Ontario plants regularly rely on over-time for production, it is not clear whether exclusion of overtime biases the results. It would not if other plants have similar overtime use.

[94] Subassemblies manufactured for other plants, off-line administrative personnel for export purposes and capitalized construction work are not included in total hours.

Table 2.6: Total Hours per Vehicle for cars and trucks (HPV).

	Canada and United States		Mexico		Mexico Percent over U.S./Canada	
	1998	1999	1998	1999	1998	1999
GM						
Cars	31.05	29.55	39.13	35.29	26.0%	19.4%
Trucks	32.57	28.35	38.13	50.53	17.1%	78.2%
DCX						
Cars	28.03	26.96	48.75	47.33	73.9%	75.6%
Trucks	34.06	31.39	42.20	38.36	23.9%	22.2%
Ford						
Cars	21.52	23.43	35.61	37.49	65.5%	60.0%
Trucks	25.20	24.21	103.08	82.20	309.0%	239.5%

Source: *Harbour Report*, 2000

Among car assembly plants, Toyota's Cambridge North plant was among the most productive plants (ranked third) out of 39 plants (launch time excluded) in 1999 with an hours-per-vehicle (HPV) of 17.6. The Toyota Cambridge South plant was ranked 15 out of 39 plants in North America but had a much higher HPV of 23.3. Ford's St. Thomas plant was ranked sixth in North America, followed by GM's Oshawa #2 and #1 plants, which are ranked seventh and eighth, respectively.[95]

Mexican assembly plants are 67% to 201% above benchmarks for hours per vehicle (HPV) in North America, and thus at the bottom of the rankings in terms of labour productivity. All in all, Mexican assembly plants use between 20% and 80% more hours to assemble a car or a truck compared to U.S. and Canadian assembly plants.[96] The lower productivity seen in Mexican plants is in part be accounted for by the relatively small scale of certain Mexican plants (e.g., the Lago Alberto DaimlerChrysler and the Cuautitlan Ford assembly plants). More importantly, it is also often reflect a deliberate choice to take advantage of lower Mexican labour costs to substitute labour for capital. In many areas, Mexican plants utilise simpler and more flexible low-cost assembly lines with below average levels of automation rather than the more highly automated systems commonly seen in the U.S. and Canada.

In general, the productivity of the Mexican workers in the manufacturing sector (excluding *maquiladora* based firms) has grown more than 56% since 1993, where productivity is measured by total manufacturing output divided by total hours of labour input (see Figure 2.16). This increase in productivity is attributable to technological improvements and the implementation of NAFTA.

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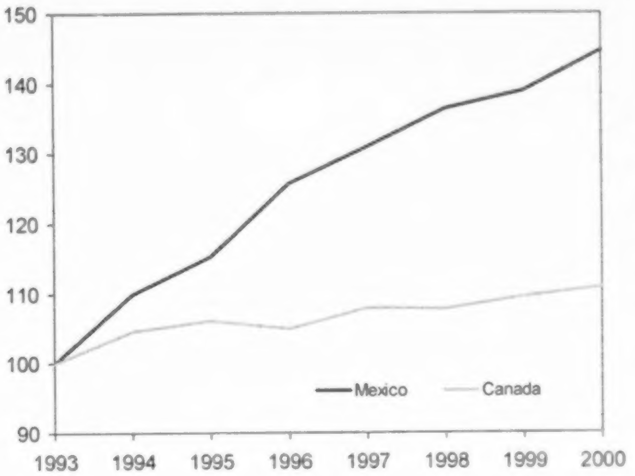
[95] Among large car plants, Ford's St. Thomas plant was ranked first.

[96] The exception is Ford trucks that are between 250% and 300% above the Canada/U.S. standard. The Cuautitlan plant is small (50,000 vehicles versus 300,00 for a world size plant) and old.

Canadian manufacturing labour productivity has also increased over the 1990s, although not at the same level of growth as that exhibited by Mexico. Below, Figure 2.16 presents Canadian and Mexican manufacturing labour productivity indices with 1993 as the base year.

Figure 2.16: Manufacturing Industry Labour Productivity Index in Mexico



Mexican workers often work more than 40 hours a week, and during the year 2000, 23% of them – or more than 12 million workers – worked more than 48 hours per week. With strong demand characterising the North American industry, assembly workers throughout North America have worked relatively long weeks in recent years. At assembly plants providing data to the *Harbour Report*, the average Canadian assembly plant employee worked 2,131 hours in 1999, and for Mexican plants, the corresponding figure is 2,053 hours per employee. Based on a 52-week year, this means that Canadian workers averaged 41 hours per week and Mexican assembly plant employees averaged 39.5 hours per week. Taking into account the fact that plants do not typically operate for 52 weeks per year due to shutdowns for model changeover and holidays, these figures suggest average work weeks in both countries exceeded 40 hours per week.

2.5 INFRASTRUCTURE

Poorly developed infrastructure can add to the costs of any investment in automotive production. In this section, we compare Mexico's infrastructure in respect of several sectors, including transportation, communications, land/buildings/construction, electric power, and natural resources. In each area, our emphasis is on the situation in Mexico rather than providing detailed information on Canada.

In general, while Canada's infrastructure is much more developed that that of Mexico's in almost all facets, not only is Mexico's rapidly improving, it has also not proven to be an important impediment to investment generally and automotive investment specifically.

2.5.A Transportation

Given Canada's land mass, it has a more extensive transportation system than that developed in Mexico. Canada also employs more of its labour force in transportation and related industries than Mexico. In 1996, 9.7% of Canada's employed labor force worked in transportation and related industries while in Mexico 6.8% of employed labor force worked in these areas.[97] That being the case, the transportation system that is in place in Mexico is similar to Canada's in terms of expansion (the percentage of paved and unpaved roads is similar in both countries) but is generally lower in terms of quality. Canada and Mexico have also been reforming their regulatory regimes in respect of transportation systems in a parallel fashion.

The poor quality of Mexico's transportation system has increased in-bound and out-bound freight costs for the automotive sector considerably in the past. This has been changing in recent years, however, as Mexico works to improve its systems. New trade relations like NAFTA and a general growth in the volume of trade with other countries have increased the flow of merchandise coming in and out of Mexico, and consequently this demands increased efficiency and competitiveness of Mexican transportation systems. As a result, railway and highway privatisation in Mexico has been met with perhaps more enthusiasm than in other regions of the world. In ports, as well, investment over the past five years has been four times the amount invested for the previous forty years. Details are provided in an Appendix to this report.

Most export-oriented Mexican facilities are located close to highway infrastructure. Facilities in northern Mexico are in close proximity to the U.S. border. For example, the distance between Saltillo or Ramos Arizpe,Coahuila and Laredo, Texas is approximately 300 km. Plants in the region near Mexico City are further from the U.S. border; the distance between Puebla and Laredo, for example, is approximately 1,200 km.

For goods that have a high value per unit volume (like finished motor vehicles and parts, and engines), transportation costs do not appear to represent a major barrier to Mexican sourcing. The US Bureau of Transportation Statistics maintains data on transborder flows that contains information on freight charges to the U.S. border for imports from both Canada and Mexico, disaggregated by broad commodity grouping and mode of transportation and by state of destination. For Canada, these statistics are also available by province of origin. Table 2.17 below presents average freight charges, by mode, for U.S. imports in commodity group 87 (Vehicles, other than railway or tramway rolling stock, and parts and accessories thereof) originating in Mexico and Ontario in 2000. These data suggest that, at this very high level of aggregation, inbound freight charges from Mexico and Ontario to the U.S. border are roughly comparable.

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[97] *North American Transportation Highlights*, Statistics Canada http://www.statcan.ca/english/freepub/50-500-XIE/transyst.htm

Figure 2.17: Average Inbound Freight Charges to the U.S. Border, by mode for 2000 (in U.S. dollars/metric tonne)

	Ontario	Mexico
Truck	46.95	33.22
Rail	44.54	42.15
Containerized Truck	72.73	13.25
Containerized Rail	21.24	54.30

U.S. Department of Transportation, Bureau of Transportation Statistics, Transborder Surface Freight Dataset www.bts.gov/transborder.

2.5.B Communications

In terms of access to information, Canada compares very favourably with other countries, including Mexico. In 1996-1998, on a per 1,000 person basis, Canada had 635 main telephone line compared to 104 in Mexico, 176 cellular mobile phone subscribers compared to 35 in Mexico, 330 personal computers compared to 47 in Mexico, and almost 37 Internet hosts compared to just over 1 in Mexico. Canada also has one of the lowest-cost telecommunications infrastructure.

In Mexico, Telmex is the sole provider of local phone service. Its monthly rates are similar to those in Canada for local service; however, in Canada there are no additional per call fees. For commercial use Telmex charges a monthly fee of $30.46; and $0.21 per call. There is no time limit on calls. Three major companies (Telmex, Alestra (AT&T) and Avantel) provide long-distance telephone services at special prices for businesses. Prices vary considerably with destination and time of day but generally range from $0.22/minute for domestic calls to $1.48/minute to Canada during peak hours. During non-peak hours, prices range from about $0.18/min for domestic calls to $0.88 for calls to Canada. These rates are generally somewhat higher than in Canada.

2.5.C Land / Building / Construction Costs

In Mexico, most industries establish themselves in industrial parks, which are subject to government standards. These standards are intended to encourage industrial park developers to improve their facilities and services, and to give new project developers the opportunity to plan and build their facilities with the highest-quality standards. Assessment and verification of the established standards are performed by a group that is accredited by the General Standards Department of the Ministry of Economy and the competent authorities. In addition to defining the parks and their components, the rules include specifications such as: the minimum surface zones to be considered an industrial park (20 hectares), basic services, infrastructure and urbanisation. The rules also stipulate that each industrial complex or park must have internal regulations to protect the interests of investors, industrial concerns, and the developers.

As a result of efforts by associations, federal and local government agencies to introduce and promote Mexico's industrial parks and assemble current information on these facilities, costs have become more uniform on both a local and national level. There are still some obvious differences in costs among parks located in the same zones, which are explained by the varying types and level of services available. Table 2.7 below shows the average prices by lease, land, and construction costs.

Table 2.7: Average Costs for Selected Mexican Industrial Parks by State

	Annual lease of industrial bays (Sq. ft. per U.S. $)	Land prices (Sq. ft. per U.S. $)	Construction costs for standard bays (Sq. ft. per U.S. $)	Total park zones (hectares)	Area available for sale (hectares)
Baja California	4.53	4.24	18.60	2,582.2	462.1
Chihuahua	5.68	5.54	25.18	1,982.0	537.8
Coahuila	4.79	2.33	22.97	1,351.7	417.6
Durango	3.76	1.77	28.12	1,427.9	341.4
Nuevo Leon	4.76	3.48	23.97	2,926.5	1,366.9
Sonora	4.58	1.50	24.38	441.3	133.7
Ags.	1.83	1.96	18.44	340.5	92.5
D.F.	8.40	17.10	28.00	35.0	5.6
Edo de Mexico	3.92	2.90	20.35	332.5	161.2
Gto.	n.a.	2.41	13.00	509.0	69.0
Morelos	2.54	8.10	29.65	230.0	10.0
Puebla	5.40	1.32	33.38	203.5	39.4
Jalisco	3.71	7.65	17.39	103.2	21.6

Source: Bancomext Industrial Costs, 2000

The lease of industrial bays represents the cost of leasing existing bays in parks and is determined by the free interplay of supply and demand conditions, the characteristics of the building, and the services offered, as well as location. The sale price for land is influenced, in the case of private projects, by the services available and the location, and in the case of government projects, by the socio-economic impact of the project. There are differences in construction cost for standard bays within a single industrial complex due to variations in specifications.

In Canada, land, building and construction costs vary considerably depending on location and product. Generally, however, building and construction costs are considerably more expensive in Canada as compared to Mexico as a result of the higher wage costs incurred in this labour-intensive industry, and because building requirements in Canada are generally more onerous in Canada than in Mexico because of the harsher winter. Canadian buildings entail the additional costs of heating systems, insulation and reinforced roofs to withstand the weight of snow.

As elaborated upon in more detail in Appendix I, if we assume the case of a 100,000 square foot plant on an 8-acre property, the initial investment costs are 13% lower in Mexico than in Canada, taking the mid-point of a range of possible locations into account. Both the costs of acquiring the land of building vary significantly across locations. In large cities (e.g. Guadalajara) initial investment costs may be significantly higher (e.g. 45.5% higher) than in Canada. In contrast, in newly developing areas of Mexico (e.g. Aguascalientes) the initial investment costs may be only one-third of what they are in Canada.

2.5.D Electricity: Availability and Costs

Automobile and automobile parts production are not particularly energy-intensive activities. In 1996, for example, energy costs represented only 0.2% of total operational costs of the Canadian motor vehicle assembly sector and only 1.5% of total operational costs of the motor vehicle parts sector. (Labour by contrast, accounted for 3.6% and 22.5% of operational costs in the two sectors, respectively.)[98] Most industry location decisions are thus unlikely to be highly sensitive to electricity and other energy costs. Energy availability, by contrast, is likely to be a far more essential concern in location decisions; since without access to reliable electric power, producers face the threat of frequent, and costly, shutdowns.

There are several potential suppliers of electric power within Mexico, including the Mexican National Electric System, independent power producers and Petróleos Mexicanos (Pemex), the Mexican state owned petroleum company. Ambitious growth in generation and transmission capacity is expected, although it takes about four years on average for investment projects in power generation to mature.

As elaborated upon in Appendix I below, if we assume the case of a 100,000 square foot plant on an 8-acre property, with 300 employees, and using 400,000 kWh a month of electricity, costs of electricity are higher in Mexico than Canada by roughly 15%, assuming electricity is $0.073 per kWh in Canada.[99]

2.5.E Natural Resources: Availability and Cost

Like Canada, Mexico is rich in natural gas and oil reserves, and, while water is not abundant, in most of the country the availability of water is greater than its exploitation (see Figure 2.18 below). In general, companies incur higher fixed costs associated with accessing water in Mexico compared to Canada since they are frequently required to put in place some or all of the necessary infrastructure.

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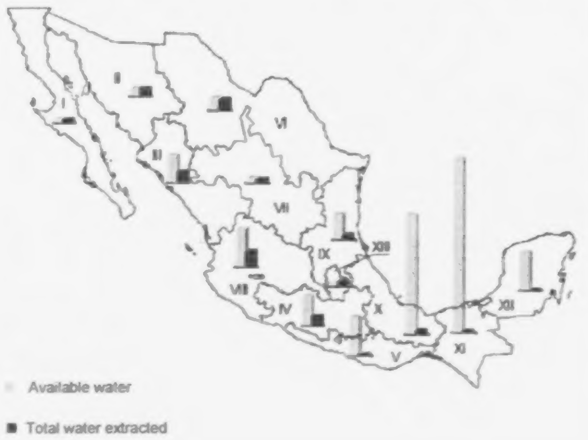
[98] The Transportation Equipment Manufacturing Sector Working Group, National Climate Change Industry Table, Greenhouse Gas Options, Policy and Measures for the Canadian Transportation Equipment Manufacturing Industry, p. A-9, citing Industry Canada Strategis Database; Canadian Industry Statistics (C.I.S. Classic).

[99] This is based on electricity rates of US$0.0485 per kWh, provided by Industry Canada and derived from a study undertaken by KPMG.

Figure 2.18: Availability of Water in Mexico



Reflecting demand, water tariffs have grown in real terms in the northern region of Mexico, where water is scarce and where industry has been growing over the last decade. Details of the considerable increase in water tariffs is provided in Table 2.8 below for a variety of locations in Mexico.

Table 2.8: Mexican Water Rates (U.S. dollars per M^3)

State	City	1995	1999	% Increase
Baja California	Tijuana	0.58	1.70	194.3%
Coahuila	Saltillo	0.48	0.77	61.5%
Coahuila	Ramos Arizpe	0.48	0.77	61.5%
Chihuahua	Cd. Juárez	0.40	0.52	28.9%
Chihuahua	Chihuahua	0.40	1.06	163.6%
Durango	Durango	n.a.	0.72	n.a.
Nuevo León	Monterrey	0.73	1.98	172.3%
Sonora	Hermosillo	0.40	0.91	124.7%
Aguascalientes	Aguascalientes	1.36	0.80	-41.2%
Federal District	Federal District	0.67	1.26	86.4%
México State	Toluca	0.48	0.86	79.1%
Guanajuato	León	n.a.	1.05	n.a.
Morelos	Cuernavaca	n.a.	0.73	n.a.
Queretaro	Queretaro	1.44	0.51	-64.8%
S.L.P.	San Luis Potosi	0.46	0.85	86.7%
Puebla	Puebla	0.37	0.84	126.8%
Tlaxcala	Tlaxcala	n.a.	0.36	n.a.
Veracruz	Jalapa	0.36	0.40	11.9%
Jalisco	Guadalajara	1.83	1.12	-38.6%

Source: INEGI, Mexico Statistical Yearbook 2000 and Bancomext, Industrial Prices 2000

2.6 R&D SUPPORT

As described earlier, Canada has one of the most generous tax treatments of R&D in the world, as well as a host of other government programs designed to encourage R&D. In this section, we describe the available information on Mexico's programs in comparison to those in Canada. In particular, we compare university R&D and research centres, industry centres, and the availability of R&D personnel.

In general, while the Mexican data on R&D expenditures in the automotive sector are unreliable, neither the Canadian or Mexican automotive sectors are characterised by high rates of R&D expenditures. While total value-added in the Canadian automotive industry is almost one-eighth (13.8%) of the value-added in the federal manufacturing industry, R&D spending is less than 3%. In 1998, $157 million (1997 dollars) was spent on labour, materials supplies, equipment and fixed assets for research and development.[100] Expenditures in 1999 on these items were estimated at $161 million (1997 dollars). In Mexico these expenditures are considerably lower. There are indications that this may change. GM has indicated that it is interested in establishing a dry-weather test station in Mexico. GM and Toyota both operate cold weather centres in Ontario.

2.6.A University R&D and Research Centres

In Canada and in Mexico, the governments actively support university R&D and research centres through a number of programs. The programs in Canada include the Canada Foundation for Innovation and Canada Research Chairs (described in Section 2.G.2 below). In Mexico, the main initiative is through the National Counsel for Science and Technology (CONACYT), which supports several research projects in research centres in almost all public and private universities. CONCACYT jointly with universities supports about 1,500 projects and 60 international scientific and technological cooperation agreements.

Specifically with respective to the Canadian automotive sector, GM in conjunction with the University of Toronto is involved in R&D projects encompassing fuel tank studies, hydroformed composite structures and alternate fuels. DaimlerChrysler and Ford also both have programs in conjunction with the University of Windsor.

2.6.B Government R&D and Research Centres

Apart from tax incentives, the Canadian federal government provides other forms of R&D support. In the 2000 Budget, the government designated funds to support major new R&D investments and initiatives. The funds that may have an indirect impact on the auto sector are outlined in an Appendix to this report. In addition, the federal government has also put in place policy and legislation in place with respect to intellectual property and trade secrecy protection, and provides government grants and contracts for R&D.

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[100] Statistics Canada publishes total intramural R&D expenditures by province. A new edition of the publication (Cat. No. 88-202-XPB) was to be released in summer 1999 with more recent data. However, Statistics Canada reports that the publication is due for release in May 2001.

The Ontario government has similarly put a number of programs in place. The 2000 Ontario Budget established the Ontario Research Performance Fund to provide over $30 million annually to colleges, universities and research institutes, to cover overhead associated with Ontario-funded research. The Ontario 2000 budget also doubled the R&D Challenge Fund to $100 million.[101] To enhance training in the R&D area, the Ontario budget earmarked $1.4 million to expand the successful Ontario Youth Apprenticeship Program to all school boards offering secondary education.

The National Counsel on Science and Technology (CONACYT) is the Mexican institution in charge of fostering and supporting research and development of science and technology in Mexico. It supervises a range of programs not unlike those in Canada. These programs are outlined in an Appendix to this report.

2.6.C Industry R&D and Research Centres

The level of spending on research and development within Canada in the motor vehicle sector is much lower than one might expect given its size relative to overall manufacturing. While total value-added in the Canadian automotive industry is almost one-eighth (13.8%) of the value-added in the federal manufacturing industry, R&D spending is less than 3%. In 1999, $161 million (1997 dollars) was spent on labour, materials supplies, equipment and fixed assets for research and development[102] (see Table 2.9 below). To the extent that automotive manufacturers have undertaken R&D in Canada, they have tended to focus on areas that complement R&D activities carried out in other countries.

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[101] The Challenge Fund is a partnership between five ministries of the Ontario government (Energy, Science and Technology; Training, Colleges and Universities; Economic Development and Trade; Finance; and Agriculture, Food and Rural Affairs) and the Ontario Jobs and Investment Board. Its purpose is a promotion of research excellence by increasing the R&D capacity of Ontario universities and other research institutions through private and public sector partnerships.

[102] Statistics Canada publishes total intramural R&D expenditures by province. A new edition of the publication (Cat. No. 88-202-XPB) was to be released in summer 1999 with more recent data. However, Statistics Canada reports that the publication is due for release in May 2001.

Table 2.9: Total Intramural R&D Expenditure for Canada (real 1997 dollars, millions)

Industry	1995	1996	1997	1998	1999
Food, Beverage and Tobacco	118	111	93	92	94
Machinery	208	184	193	190	205
Aircraft and parts	778	826	1014	1035	956
Motor vehicles, parts and accessories	**190**	**173**	**176**	**157**	**161**
Telecommunication equipment	1426	1541	1746	2059	2108
Electronic parts and components	70	85	85	96	110
Other electronic equipment	362	321	343	351	359
Business machines	349	335	358	347	352
Pharmaceutical and medicine	472	565	542	595	643
Other chemical products	211	164	150	147	146

Source: Statistics Canada, *Industrial Research and Development*, Catalogue No. 88-202-XPB; CPI data is taken from CANSIM, Statistics Canada.

Notes: Numbers for 1998 are preliminary. 1999 numbers are projected.

It should be noted that the low R&D numbers for Canada are not indicative of the level of R&D research for the automotive industry as a whole. In the U.S., expenditures on R&D in the automotive industry in 1998 were $20.1 billion[103] (in 1995, they were even slightly higher at $20.3 billion[104]). This represents 13% of all R&D spending (excluding spending by the federal government) in the manufacturing sector in the entire U.S., not just the automotive producing states.

Figure 2.19 below shows the percentage of industrial R&D spending accounted for by various industries. In Canada, R&D expenditures in the automotive industry are lower than R&D expenditures in chemicals (including pharmaceutical chemicals), aircraft and parts, or business machines. By contrast, U.S. R&D expenditures in the automotive industry are higher than any other three-digit SIC class.[105]

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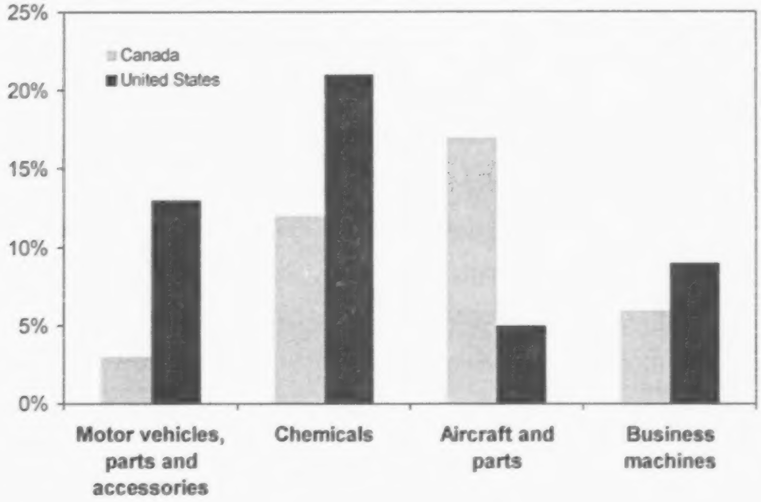
[103] An exchange rate of US$0.67=CDN$1.00 was used.

[104] An exchange rate of US$0.67=CDN$1.00 was used.

[105] 'Chemicals' in Figure 4 is for the two-digit SIC class. The referenced Statistics Canada publication does not provide R&D expenditures for Chemicals at the three-digit level.

Figure 2.19: Comparison of U.S. and Canadian R&D Expenditures (as a Percentage of Industrial R&D) in Selected Industries



Source: Statistics Canada: Industrial Research and Development, Catalogue No. 88-202-XPB; National Science Foundation, Research and Development in Industry: 1988, www.nsf.gov.
Note: The 1998 numbers for Canada are preliminary.

The reason for the discrepancy between R&D expenditures in Canada and the U.S. does not appear to be as a result of differences in the tax regimes. Both corporate taxes and payroll levies are reported to be lower in Ontario than in U.S. auto producing states in 1997.[106] The Ontario tax system also offers more favourable treatment of R&D than do auto-producing American states. The cost of $1 in R&D expenditure in 1997 was just over $0.50 after taxes in most Canadian provinces while the cost in automotive assembly U.S. states was higher, averaging $0.528.[107]

The fact that most R&D is undertaken in the U.S. has little bearing on where new technologies are implemented. As discussed above, the Canadian assembly plants are part of an overall North American market in respect of corporate decision making; they do not have "branch plant status". Canadian plants will be used to produce vehicles with new technologies if this is profitable.

It is possible that the European automotive market plays an indirect role in introducing new technologies to North America. Higher fuel prices, regulator policies that favour diesel, and differences in consumer tastes between Europeans and North Americans have impeded integration of North American and European markets to date. As a result, automakers have been unsuccessful in marketing the same vehicle in both markets and typically address each market separately. The conditions in Europe have favoured production of smaller, more fuel-efficient vehicles.

Despite the lack of integration of the European and North American markets, technologies developed for the European market or technology spin-offs from Europe could be used to reduce fuel consumption in North America. Now that each of the Big Three has a presence in Europe, technology transferred from Europe to North America can be used within existing North American facilities to the extent that the technology allows it.

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[106] Reported by Industry Canada, "The Competitiveness of the Canadian Automotive Sector: Facts and Figures", February 1998 citing KPMG, 1997 and Oregon Department of Consumer and Business Services data.

[107] Reported by Industry Canada, citing the Conference Board of Canada, 1997.

Data on R&D expenditures in the Mexican automotive industry are not reliable but generally these expenditures are low in keeping with the above noted low overall expenditure in Mexico on R&D as a percentage of GDP (approximately 0.5% as compared to 1.64% in Canada). Automotive manufacturers have started undertaking some R&D in Mexico. For example, GM recently built a 55,000 square foot vehicle prototype design centre at its Toluca complex that employs 250 engineers working on projects for the entire corporation. Delphi recently doubled the existing space of its Technical Centre in Ciudad Juarez to 450,000 square feet. The Delphi facility designs, develops and markets world-class, technologically advanced automotive components and systems. It houses 1,600 engineers, technicians and support staff who are of world-class talent. It should also be noted that Delphi employs 72,000 people in 50 Mexican plants, almost half of which have received the ISO 14001 certification.

3. ASSESSMENT OF THE COMPETITIVENESS OF AUTOMOTIVE SUB-SECTORS

In this section we assess the competitiveness of Mexican producers in various sectors and sub-sectors of the automotive industry. We first discuss vehicle assembly and two automotive parts sectors controlled by OEM manufacturers – engines and major body stampings. We then go on to discuss other parts sectors where independent component suppliers dominate production.

OEMs (and many component manufacturers) interviewed by CRA uniformly praise the quality of Mexican workers and assert that the inherent productivity of Mexican labour is high, if not higher, than that of U.S. and Canadian workers. Many of those interviewed especially praised the flexibility of their Mexican work force, which while uniformly unionised, is not subject to rigid job classifications or work rules, and which can be deployed using the team-based production methods characteristic of the highly efficient and quality-conscious "lean production" methods pioneered by Japanese manufacturers. This view has been echoed by outside observers of these plants, including the authors of the *Harbour Report*.

Despite these glowing assessments, labour productivity in assembly as measured in hours per vehicle (HPV) in Mexican assembly plants typically lags the productivity seen in U.S. and Canadian plants. In practice, however, these productivity differences are of little economic significance as they are largely attributable to differences in product mixes and the deliberate use of more labour-intensive methods of production to take advantage of lower Mexican labour costs.

In terms of future trends, despite the appeal of Mexico, overall prospects for growth in both Mexican and Canadian assembly sectors are constrained by the existence of substantial excess capacity throughout North America and the world. If, however, new capacity is required, Mexico appears to be a highly desirable location in which to establish a new facility.

With respect to auto parts, the future prospects of Mexico depend on the type of part in question; although, in general, broader trends in the automotive industry probably favour the growth of Mexican parts facilities. Broadly speaking, Mexico's competitive strengths in international trade lie with those parts using high labour content, particularly parts that are not required on a just-in-time basis. These include parts such as seat belts, seat covers and the final assembly of automotive electrical and electronics components. Low labour costs also largely lie behind Mexico's strong competitive position in many other automotive components involving electrical components, such as lighting, starter motors, generators, ignition systems, and windshield wipers. As Mexico's wages rise, however, Mexico will likely gradually lose its labour cost advantages in these products to lower cost producers in Southeast Asia. Mexico's competitive weaknesses have been capital-intensive parts, particularly those that are relatively hard to ship, or those that are required on a just-in-time basis. Such parts include transmissions and transmission parts, some body parts and stamping capabilities. Mexico also suffers in comparison to Canada and the United States in the production of plastic parts because of the thinness of the Mexican industrial base in supplying plastic resins. Finally, Mexico has traditionally been a large producer of engines and engine parts with growth in engine production roughly keeping pace with growth in Mexican assembly output.

3.1 ASSEMBLY

As noted earlier, Mexico has numerous advantages as a location for automotive assembly, including: low wages, a highly productive and flexible work force, a rapidly growing domestic market, geographic proximity to the southwestern U.S., and access via free trade agreements to markets in North America, South America, and Europe. We discuss each of these advantages below.

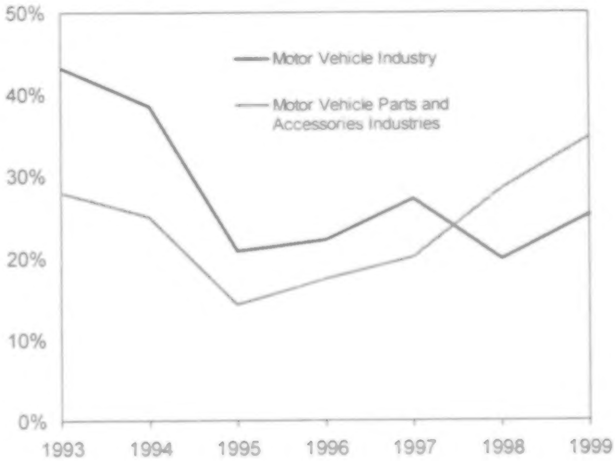
Weighed against these advantages are certain disadvantages of producing in Mexico, which we find are gradually becoming less important over time. Historically, Mexico's distance from core North American markets and the comparatively poor quality of Mexican transportation infrastructure resulted in high outbound freight costs for exported vehicles. This has been mitigated by several factors, including the growth of Mexican demand for vehicles; OEM choices to produce vehicles (particularly SUVs and pickup trucks) in Mexico that are in high demand in the southwestern U.S.; and, improvements in Mexican transportation infrastructure. The lack of a world-class supply base for many automotive components also has hindered the growth of Mexican production, resulting in high inbound freight costs to source products from outside Mexico. The opening of the Mexican market to foreign-based component suppliers and their willingness to produce locally for Mexican assemblers is increasingly reducing these costs as well.

3.1.A Labour Cost

Wages and labour compensation packages in vehicle assembly are typically higher than those in component manufacturing in Mexico, as in the U.S. and in Canada. Nonetheless, the cost of employing Mexican assembly workers is considerably lower than that of employing Canadian or U.S. workers to do the same task. As noted in Section 2, annual wages plus mandated benefits for assembly workers in Mexico are 34% of the Canadian levels and for parts workers annual wages plus mandated benefits are 23% of Canadian levels. Consistent with these data is information from Big Three representatives who indicated that the total compensation package for an assembly worker in Mexico is approximately $10 per hour compared to $40 per hour for Canada.

At a U.S. or Canadian automobile plant, final vehicle assembly typically requires 20 to 30 worker hours. Thus, all else equal, shifting production of a vehicle from Canada to Mexico can potentially yield labour cost savings of roughly $600 to $900 per vehicle in assembly alone assuming Mexican labour costs are approximately 25% of Canadian labour costs.

Figure 3.1 Mexican Automotive Wages as a Percentage of Canadian Automotive Wages



3.1.B Capacity and Utilisation

Canadian automotive assembly plants are on average considerably larger than those in Mexico and have higher rates of utilisation. In 1999, Canadian plants had an average capacity of 3,133,500 vehicles per year while Mexico's average capacity was almost half that at 1,733,152 vehicles per year, with five of twelve plants having capacity to produce less than 100,000 vehicles.

Canada used its higher capacity more effectively. In 1999, Canada's average capacity utilisation rate was 95.6% while that of Mexico was 83.6%. Capacity utilisation varied considerably across plants in both countries (29.8% to 137.0% in Canada and 26.7% to 134.7% in Mexico); although, Mexico had higher portion of its plants producing at less than the average Mexican utilisation rate (8 of 15 plants in Canada had utilisation rates less than 95.6%; 8 of 12 plants in Mexico had utilisation rates less than 83.6%).

Figure 3.2 Mexican Plant Utilisation Rates, 1999

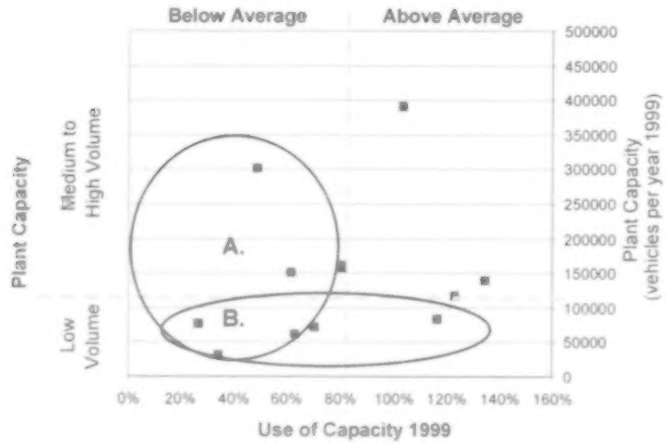
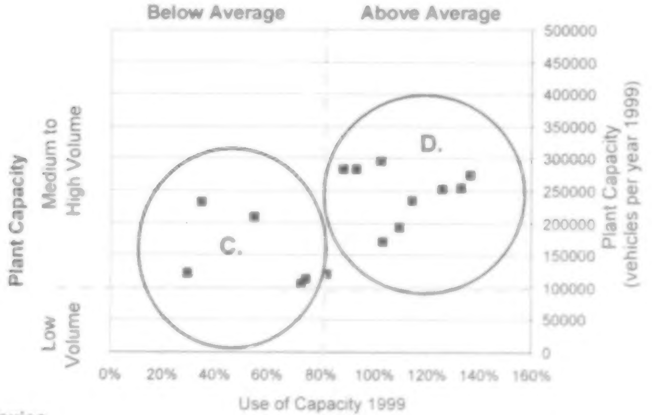


Figure 3.3 Canadian Plant Utilisation Rates, 1999



Mexico

A. More than half of Mexican plants operate below the average for use of capacity

B. 5 of 12 plants only have the capacity to produce in low volumes (<100,000 units)

Canada

C. A majority of Canadian plants are high volume plants with an above average use of capacity

D. 6 of 15 of Canadian plants operate at below average use of capacity

3.1.C Productivity

The preceding analysis of labour cost savings assumes, however, equal productivity of Mexican and Canadian workers. How realistic is such an assumption? OEMs (and many component manufacturers) interviewed by CRA uniformly praise the quality of Mexican workers and assert that the inherent productivity of Mexican labour as high, if not higher, than that of U.S. and Canadian workers. By virtue of offering, by Mexican standards, very generous compensation packages, OEMs can attract and retain workers of very high quality. Many of those interviewed especially praised the flexibility of their Mexican workforce, which while uniformly unionised, is not subject to rigid job classifications or work rules, and which can be deployed using the team-based production methods characteristic of the highly efficient and quality-conscious "lean production" methods pioneered by Japanese manufacturers. This view has been echoed by outside observers of these plants, including the authors of the *Harbour Report*. In the 2000 edition, the report noted that "[i]mplementation of the Ford Production System is probably better at the Hermosillo plant than at any other assembly or stamping plant in North America".[108] In 1999, the *Harbour Report* found with respect to DaimlerChrysler's Saltillo plan that:

> "the work force fully participates in continuous improvement processes, which are not all management directed.... [Employees] are highly skilled, well educated and self-sufficient. Saltillo is one of DaimlerChrysler's best assembly plants because employees are implementing many aspects of lean manufacturing quicker and more comprehensively than most U.S. plants...Saltillo boasts one of DaimlerChrysler's highest quality ratings – whether measured by warranty records or J. D. Power. In addition, Saltillo is one of the safest DaimlerChrysler plants for both ergonomics and other injuries.... By far, this plant is one of DaimlerChrysler's highest returns on investment. The automotive industry can learn a lot from this group of workers. With its high level of employee initiative and participation, Saltillo is a first rate plant."[109]

Despite these glowing assessments, labour productivity in assembly as measured in hours per vehicle (HPV) in Mexican assembly plants typically lags the productivity seen in U.S. and Canadian plants, as we have previously noted in Section 2. Although auto workers in Canada and Mexico work a similar number of hours, the hours spent per vehicle are considerably higher in Mexico (on average 74% higher for the Big Three plants in 1999) such that 45% fewer vehicles were produced per worker in Mexico in 1999 (see Figure 3.4).

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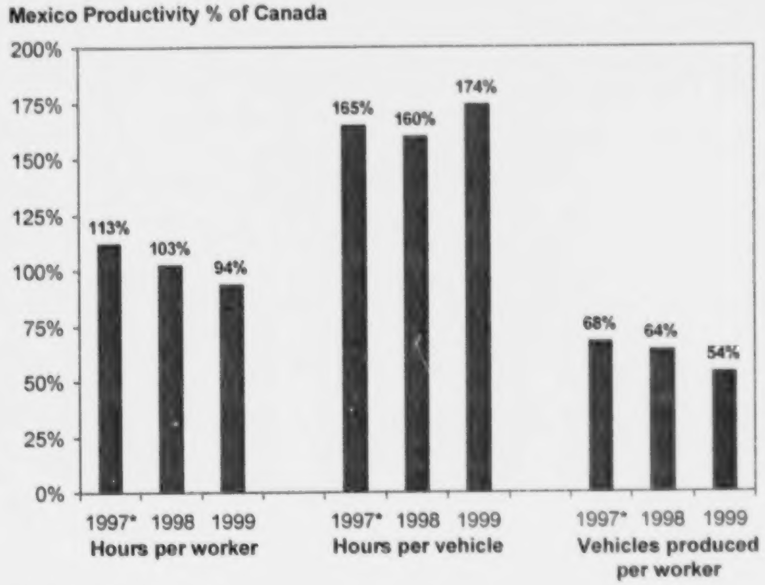
[108] "Implementation of Modern Production Techniques", Harbour Report 2000.

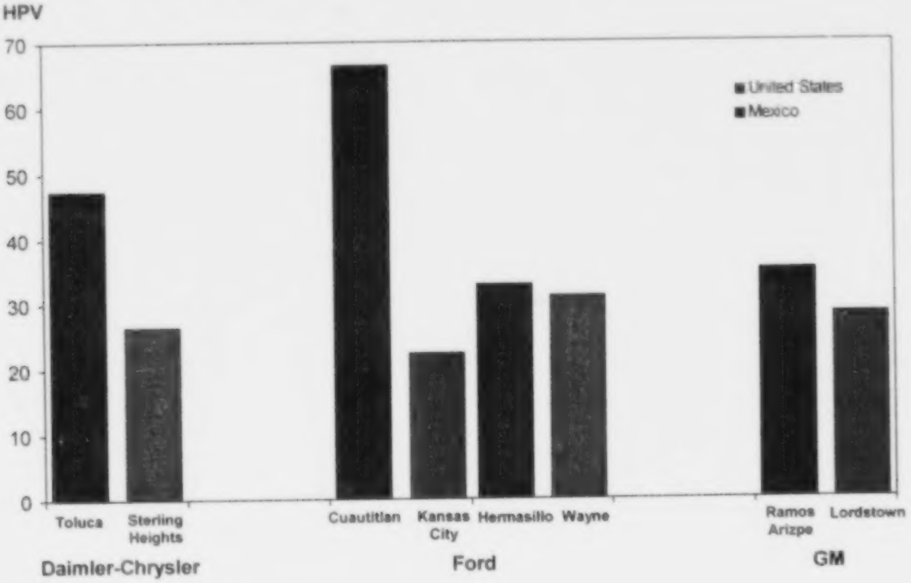
[109] *Harbour Report* 1999.

Figure 3.4 Productivity Indicators for an Aggregate of the GM, Ford and DaimlerChrysler Plants, Canada and Mexico



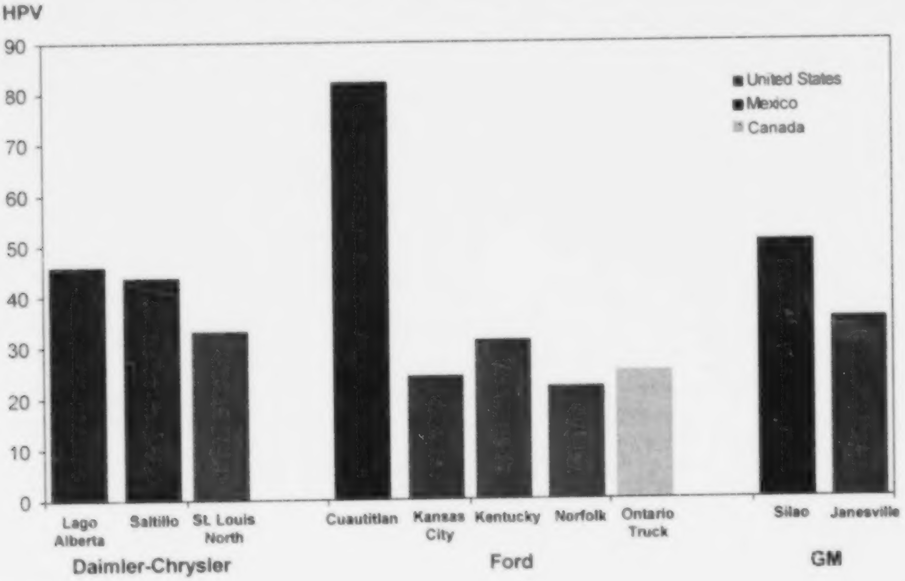
*1997 data based only on Q4
Source: Harbour Report, 1997–1999

Figure 3.5 Productivity in Comparable Car Assembly Plants, 1999



Source: Harbour Report, 2000

Figure 3.6 Productivity in Comparable Truck Assembly Plants, 1999



Source: Harbour Report, 2000

In practice, however, these observed aggregate productivity differences are of little economic significance. This point can be seen in Figures 3.5 and 3.6, which shows 1999 HPV performance for the Big Three car and truck assembly plants in Mexico beside the HPV figures recorded by the U.S. and Canadian plants producing *closely comparable vehicles*. Consistent with the overall productivity figures presented in Section 2, these figures reveal that except for DCX Saltillo, which has lower HPV than DCX St. Louis North, Mexican assembly plants have higher HPV than their U.S. and Canadian counterparts.

For most of these plants, however, the differences are relatively slight, particularly given the large labour cost differential between Mexico and Canada (and the U.S.). Among the newer or recently remodelled assembly plants with lines of annual capacities of over 100,000 units (DCX Toluca, DCX Saltillo, GM Silao, GM Ramos Arizpe, and Ford Hermosillo) only at DCX Toluca were HPV more than 50% greater than at the most comparable U.S. or Canadian plants. Moreover, the DCX Toluca plant was producing a much wider variety of products than its U.S. counterpart as well as undergoing a major model changeover in 1999, which explains a large part of the difference with U.S. facilities. Similar, although less dramatic, differences in product mix also explain a portion of the differences in HPV between the larger Mexican facilities and their U.S. counterparts. Nonetheless, most of the difference is probably due to the deliberate use of more labour-intensive methods of production to take advantage of lower Mexican labour costs. For example, in the bodyshop of its Silao plant, GM is reported to be using only 80 robots, and then only for tasks that are mandated by quality or safety concerns, while its factory in Janesville, Wisconsin uses 600 robots.[110] With such low labour costs, it is to be expected that OEMs operating in Mexico will choose to use greater labour per vehicle than in higher labour cost environments, such as Canada and the U.S.

Alone among Mexican plants operated by the Big Three, Ford's Cuautitlan car and truck assembly lines have much higher HPV than U.S. and Canadian plants producing similar products. This difference clearly reflects the sub-optimal scale of the lines, which each have a capacity of only 75,000 units per year, and a deliberate decision to use more labour-intensive methods when producing on this scale.

Overall, therefore, the picture painted by the *Harbour Report* and our interviews is that while Mexican labour is highly productive and could achieve HPV figures comparable to those seen in the U.S. and Canada, observed HPV in Mexico reflect deliberate decisions to use less capital-intensive methods of production to take advantage of lower labour costs or to accommodate the smaller scale of certain production lines.[111]

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[110] John Lippert, " Mexico Becomes Motown South," *Bloomberg Magazine* (http://www.bloomberg.com/promag/ft3_0007.html).

[111] Real automotive GDP per automotive worker was calculated in both countries; however, a comparison of these figures between Canada and Mexico are not meaningful as the main driver of change in the Mexican productivity figure when expressed in Canadian dollars is the large changes in the Canadian dollar/peso exchange rate.

3.1.D Future Prospects for the Mexican and Canadian Assembly Sectors

The overall prospects for the growth of the Mexican and Canadian assembly sectors are constrained by the existence of substantial excess capacity throughout North America and the world. For any company in need of additional capacity to serve the North American market, Mexico appears to be a highly desirable location in which to establish a new facility. For firms with excess capacity, however, the large amount of capital required to establish new plants and the cost of the guarantees that U.S.-based OEMs have made to their U.S. and Canadian workers mean that the economics of shutting down plants in the U.S. or Canada and replacing such facilities with a new plant in Mexico are not likely to be favourable.

On the whole, North America is far likelier to see more plant closings than plant openings over the next decade as manufacturers seek to rationalise production within their existing facilities.[112] As capacity is rationalised, those plants in Canada and in Mexico that will require major levels of investment to remain viable producers of high-quality vehicles are extremely vulnerable. In Mexico, DaimlerChrysler has already announced plants to close its Lago Alberto truck plant in 2002 and to transfer its production to its newer Saltillo facility. In Canada, GM's Ste. Therese plant and DCX's Pillette Road plant, neither of which has an assigned future product, are the most vulnerable plants as capacity rationalisation proceeds.

On balance, though, the remaining Canadian assembly plants are likely to be relatively unaffected by capacity rationalisation as they offer their owners a combination of high efficiency (low HPV), high quality, and low (by U.S. standards) labour costs. Moreover, Canadian plants produce a product mix heavily weighted towards "core products" such as midsize to large cars, pickup trucks, and vans for which, barring severe energy shocks, demand is likely to remain relatively stable. In addition, where strategic capacity expansions are required to meet demands for new products, Canada will likely remain a viable choice for new investment, as recent decisions by Toyota to produce Lexus SUVs at Cambridge and by Honda to establish minivan production at Alliston illustrate.

Despite the closing of Lago Alberto, Mexico is likely to gain assembly capacity even as capacity throughout North America is rationalised. Given overall labour costs, the growth of the domestic market, and the emergence of Mexico as a potential free trade hub, Mexico is likely to attract a disproportionate share of any new investment needed to rationalise North American production capacity in fewer plants. The capacity of several Mexican plants has recently been expanded and can continue to be expanded through strategic investments in "debottlenecking." According to Bloomberg, for example, GM contemplates increasing production at Silao to 240,000 from its 1999 production level of roughly 130,000 vehicles units per year following the introduction of the Chevrolet Avalanche pickup/SUV hybrid to the mix of products produced at the plant. Similarly, Nissan has expanded capacity at Aguascalientes to support production of the Sentra and a Renault model new to the Mexican market. In addition, lower labour costs and the opportunity to establish flexible work arrangements make Mexico an ideal spot in which to produce "niche market" vehicles that cannot justify a dedicated full-scale assembly plant. As one example, GM has recently chosen to expand its Ramos Arizpe plant to accommodate production of the Pontiac Aztec and Buick

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[112] An exception to this trend is Volkswagen's decision this year to expand its operations in Mexico, investing over $1 billion over the next five years to increase capabilities in Mexico.

Rendezvous SUVs. These vehicles are being built using modular assembly techniques in which suppliers of component subsystems take responsibility for producing large parts of the vehicle on site – a production strategy that would be very difficult to implement in Canada or the U.S.

3.2 PARTS

An examination of Mexican parts exports to the U.S. as a percentage of Canadian parts exports to the U.S. indicates that Mexico has a clear competitive advantage in four product areas: motor vehicle chassis fitted with engines, seat belts, radiators and motor vehicle steering systems and related parts. In remaining parts segments for which information is available, Canada dominates Mexico in terms of exports to the U.S. (see Table 3.1).

Table 3.1: Mexican Exports to the U.S. as Percentage of Canadian Exports to the U.S., 1994-1999

Parts Segment	Mexican Exports to the U.S. as a % of Canadian Exports to the U.S., 1994–1999
Motor vehicle chassis fitted with engines	21,371%
Motor vehicle bodies	25%
Bodies for motor vehicles other than automobiles	7%
Bumpers and related parts	8%
Seat belts	1,171%
Parts and accessories for motor vehicle bodies	38%
Mounted brake linings	6%
Parts for brake systems	21%
Gear boxes	15%
Drive axles with differential	16%
Non-driving axles and related parts	24%
Road wheels and related parts and accessories	34%
Suspension shock absorbers	7%
Radiators	376%
Mufflers and exhaust pipes	14%
Motor vehicle clutches and parts	165%
Motor vehicle steering systems and related parts	390%
Other motor vehicle parts	22%

3.3 STAMPING

Stamping represents a sector of the automotive industry where Mexico appears to be at a relative disadvantage, largely due to the lack of suitable domestically produced inputs. Both independent suppliers of vehicle stampings and OEMs interviewed by CRA report that they need to import raw materials for many stamped parts because the Mexican steel industry does not have the capability of producing steel of the quality needed for most body parts. In addition, a firm establishing a stamping facility must import most of its capital equipment and the personnel needed to install it. While Mexico has some capability to support the installation of smaller and lighter stamping presses, larger and heavier equipment must be imported from abroad.

Nonetheless, broader trends in the automotive industry probably favour the growth of Mexican stamping capabilities. Most new or newly renovated vehicle assembly plants have contiguous stamping facilities associated with them, as the reduction of damages in transit and the ability to monitor quality at the assembly plant before thousands of parts are produced have proven to contribute significantly to vehicle quality. Thus five of the eight assembly plants in Mexico – the five high-volume Big Three plants producing largely for export (DCX Saltillo and Toluca, GM Silao and Ramos Arizpe, and Ford Hermosillo) – have twin stamping plants nearby. For similar quality reasons, as well as to reduce inbound freight charges, manufacturers prefer to acquire purchased stampings from nearby facilities. In response, major stamping suppliers are establishing stamping plants in Mexico.

3.3.A Productivity

In the case of Big Three facilities, Mexican plants have rankings that are between 29% and 94% above North American benchmarks for hits per worker (HPW) and pieces per worker (PPW) and hits and pieces per hour (PPH). Some of this difference may reflect the relatively smaller scale of production on most vehicle assembly lines, leading to smaller stamping production runs and more frequent die changes. In the case of transfer presses, however, Hermosillo is the benchmark for North America (see Table 3.2).

Table 3.2: Mexican Stamping Plant Ranking

	HPW (43 plants ranked)			PPW (43 plants ranked)			HPH – Total (43 plants ranked)		
Plant	1999 HPW	% Under BM	Ranking	1999 PPW	% Under BM	Ranking	1999 PPW	% Under BM	Ranking
DCX Saltillo	12	83%	35	18	83%	31	283	49%	37
DCX Toluca	17	76%	26	28	72%	21	336	40%	31
Ford Hermosillo	8	88%	40	10	90%	40	387	31%	25
GM Ramos Arizpe	6	92%	42	6	94%	42	200	64%	43
GM Silao	5	92%	43	6	94%	42	203	64%	42

	PPH – Total (43 plants ranked)			HPH - Tandem (32 plants ranked)			PPH – Tandem (32 plants ranked)		
Plant	1999 PPW	% Under BM	Ranking	1999 PPW	% Under BM	Ranking	1999 PPW	% Under BM	Ranking
DCX Saltillo	436	53%	32	-	-	-	-	-	-
DCX Toluca	514	45%	27	266	38%	25	392	42%	15
Ford Hermosillo	623	33%	11	308	28%	12	478	29%	8
GM Ramos Arizpe	200	79%	43	200	53%	32	200	70%	32
GM Silao	238	75%	42	203	52%	31	238	65%	31

	HPH – Transfer (38 plants ranked)			PPH – Transfer (38 plants ranked)		
Plant	1999 PPW	% Under BM	Ranking	1999 PPW	% Under BM	Ranking
DCX Saltillo	283	63%	35	436	67%	32
DCX Toluca	525	31%	14	842	36%	10
Ford Hermosillo	761	Benchmark	1	1,309	Benchmark	1
GM Ramos Arizpe	-	-	-	-	-	-
GM Silao	-	-	-	-	-	-

Legend.- HPW: Hits per Worker; PPW: Pieces per Worker; HPH: Hits per Hour; PPH: Pieces per Hour

Source: *Harbour Report 2000*.

Balanced against the relatively low productivity as measured by the conventional measurements presented above, however, are the advantages Mexican stamping facilities have obtained in utilising flexible production methods. As noted in Section 2, average die changeover times at Mexican plants can only be compared to those of Japanese manufacturers, and the highest ranking of Big Three plants for tandem as well as transfer presses are Mexican.

While Canadian Big Three stamping plants cannot match Mexican plants in flexibility, they do fare much better than Mexican plants in conventional productivity measures. Among North American plants, GM Oshawa ranks 15th and 8th in HPH and PPH, respectively; DCX Bramalea ranks 14th and 30th. Moreover, Toyota Cambridge is the third best plant in both HPH and PPH in North America.

3.3.B Future Prospects for the Mexican and Canadian Stamping Sectors

Overall, the prospects for the Mexican stamping sector are tied closely to the fate of the Mexican assembly sector. Because of the low quality of Mexican steel, and because most stampings are relatively expensive to transport, Mexico is highly unlikely to develop a significant export stamping business. Further growth in stamping serving the growing production in Mexican assembly plants is, however, likely. Similarly, growth in Canadian stamping activity is likely to be closely tied to growth in Canadian assembly activity and to growth in assembly activity in the U.S., particularly at the many U.S. plants within a few hours of the Canadian border.

3.4 ENGINES

The Mexican engine sector is large relative to the size of Mexico's assembly sector. The *Harbour Report 2000* estimates that the total engine production by DCX, Ford, GM, Nissan, and Volkswagen in Mexico was nearly 2.3 million units in 1999, while vehicle production by these firms amounted to approximately 1.4 million units. Thus, Mexico is a net exporter of spark ignition engines to the U.S. and Canada, as Table 3.3 illustrates. Note, however, that both Mexican exports and its trade balances have been fairly stable over the last five years, suggesting no significant movement of engine production to Mexico.

Table 3.3: Mexican Trade Balances in Spark Ignition Engines, 1996-2000 (Millions of Canadian Dollars)

		1996	1997	1998	1999	2000
Exports						
	Canada	$282.2	$177.1	$129.7	$308.1	$254.8
	U.S.	$2,217.3	$2,218.5	$2,285.0	$2,235.9	$2,152.9
Imports						
	Canada	$0.9	$0.1	$0.0	$0.0	$0.0
	U.S.	$381.8	$668.6	$570.5	$529.9	$1,231.2
Trade Balance						
	Canada	$281.3	$177.0	$129.7	$308.1	$254.8
	U.S.	$1,835.5	$1,550.0	$1,714.5	$1,706.0	$921.7

Source: U.S. and Canadian trade data for Tariff Code HS 840734 (Reciprocating Piston Engines for Road or Off-Highway Motor Vehicles - Displacing Over 1,000 cc) obtained from Statistics Canada and the U.S. Census Bureau by Industry Canada, Strategis database.

The prominence of Mexico in engine production owes much to the various Mexican auto decrees, and particularly the trade balancing provisions of the 1977 Auto Decree, which created powerful incentives for firms operating in Mexico to set up export-oriented components facilities. Engines were a logical choice for export for several reasons. First, Mexico possessed significant experience and infrastructure relevant to support metal casting. Second, the high value of engines would generate significant export credits. Finally, the combination of high value and density that characterise engines makes it relatively economical to ship engines great distances. As a result, all the major manufacturers in Mexico established at least one engine plant in Mexico, and all except Volkswagen were net exporters in 1999.

While Mexico is a large net exporter of spark ignition engines, the reverse appears to be true for diesel engines, the production of which has not benefited from historical government incentives. As Table 3.4 shows, Mexico is a large net importer of diesel engines from the U.S., although it is a small net exporter to Canada. Unlike the case for spark ignitions, Mexico's trade balance in diesel engines has worsened over the last five years. Note, however, that with the exception of 2000, Mexico's combined trade deficit in diesel engines with the U.S. and Canada has been a third or less the size of its surplus in spark ignition engines.

Table 3.4: Mexican Trade Balances in Diesel Engines for Vehicles, 1996-2000 (Millions of Canadian Dollars)

		1996	1997	1998	1999	2000
Exports						
	Canada	$0.5	$6.2	$16.1	$1.4	$4.5
	U.S.	$33.7	$44.4	$134.5	$117.7	$125.3
Imports						
	Canada	$0.0	$0.0	$0.2	$0.0	$0.0
	U.S.	$165.8	$443.1	$415.9	$770.8	$1,106.9
Trade Balance						
	Canada	$0.5	$6.2	$15.8	$1.4	$4.4
	U.S.	-$132.1	-$398.7	-$281.4	-$653.1	-$981.6

Source: U.S. and Canadian trade data for Tariff Code HS 840820 (Diesel Engines for Road or Off-Highway Motor Vehicles) obtained from Statistics Canada and the U.S. Census Bureau by Industry Canada, Strategis database.

3.4.A Productivity

Mexican plants producing spark ignition engines are between 84% and 420% above benchmarks for hours per engine in North America, and thus often at the bottom of the labour productivity rankings. As in the case of assembly plants some plants are small (e.g. the Toluca DaimlerChrysler plant) while other manufacturers deliberately use flexible, low-cost assembly lines with below average levels of automation that incorporate pieces from suppliers in different countries (e.g. GM's Toluca plant). Table 3.5 provides the engine plant ranking.

Table 3.5: Mexican Engine Plant Ranking Hours Per Engine (HPE)

Plant	1999 HPE	% Over BM
4 Cylinders		
DCX Saltillo	4.19	84%
Ford Chihuahua	7.13	213%
GM Toluca (1.4, 1.6L, 3.0L L4)	11.84	420%
6 Cylinders		
GM Ramos Arizpe	7.06	105%
GM Toluca (4.1, 4.8L L6)	9.63	179%
8 Cylinders		
DCX Toluca	8.45	116%
GM Toluca (5.0, 5.7L V8)	9.83	151%

Source: *Harbour Report* 2000.

By contrast, Canadian engine plants, reflecting their large scale and high degree of automation, are all in the upper half of productivity for North American plants in their cylinder classes. Ford Essex's V-6 lines averaged 4.03 HPE, just 17% over benchmark; GM's St. Catherines V-8 plant averaged 4.74 HPE, 21% over benchmark, and labour hours for Ford Windsor's two V-8 products averaged 5.71 HPE, 46% over benchmark.

3.4.B Engine Parts

While Mexico has been historically strong in production and export of completed engines, it has been historically much weaker in engine parts. Building on its traditional strengths in casting, Mexico seems to have reversed this trend. Trade data as shown in Tables 3.5 and 3.6 reflect the improvement in Mexico's trade position in spark ignition and diesel engine parts, respectively. Table 3.6 shows that Mexico ran a trade deficit in spark ignition engine parts with the U.S. from 1996 and 1997, but has shown a surplus since 1998. (Canada showed a trade deficit in engine parts with Mexico from 1996 through 2000, with this deficit widening over the past two years.) Table 3.7 shows that the last two years have seen a dramatic narrowing in Mexico's trade deficit in diesel engine parts with the U.S. and an increase in its surplus with Canada such that it became a net exporter to the two countries combined in 2000.

Table 3.6: Mexican Trade Balances in Miscellaneous Spark Ignition Engine Parts, 1996-2000 (Millions of Canadian Dollars)

		1996	1997	1998	1999	2000
Exports						
	Canada	$73.8	$88.0	$73.8	$106.8	$181.3
	U.S.	$243.0	$374.1	$655.7	$893.1	$1,101.4
Imports						
	Canada	$24.9	$22.9	$15.1	$8.3	$15.1
	U.S.	$552.2	$602.9	$467.5	$345.5	$838.6
Trade Balance						
	Canada	$48.9	$65.1	$58.7	$98.5	$166.3
	U.S.	-$309.2	-$228.8	$188.2	$547.7	$262.8

Source: U.S. and Canadian trade data for Tariff Code HS 840991(Parts Solely for Spark-Ignition Internal Combustion Type Engines, NES) obtained from Statistics Canada and the U.S. Census Bureau by Industry Canada, Strategis database.

Table 3.7: Mexican Trade Balances in Miscellaneous Spark Ignition Engine Parts, 1996-2000 (Millions of Canadian Dollars)

		1996	1997	1998	1999	2000
Exports						
	Canada	$12.4	$24.4	$26.3	$40.3	$38.9
	U.S.	$101.3	$110.7	$180.4	$278.2	$297.8
Imports						
	Canada	$0.0	$0.4	$1.4	$1.1	$0.6
	U.S.	$173.5	$163.6	$291.3	$350.4	$302.8
Trade Balance						
	Canada	$12.4	$24.0	$24.9	$39.3	$38.3
	U.S.	-$72.2	-$53.0	-$110.9	-$72.2	-$5.1

Source: U.S. and Canadian trade data for Tariff Code HS 840999 (Parts for Diesel and Semi-Diesel Engines) obtained from Statistics Canada and the U.S. Census Bureau by Industry Canada, Strategis database.

Mexico is clearly well positioned to take advantage of some of its traditional strengths in casting to produce engine blocks and heads for export. For example, Nemak, a Mexican firm in which Ford holds a 20% interest, has exploited the trend of using aluminum instead of cast iron to increase its market share. Nemak is a leading producer of aluminum engine blocks and heads that is reported to have made 33% of all North American made cylinder heads, compared with 18% in 1992.[113] Among its customers are the Ford Essex and GM St. Catharines engine plants. Similarly, Castech, a Mexican/German joint venture has been awarded a contract to supply General Motors with 500,000 engine blocks and 1 million cylinder heads per year for a new V-6 engine scheduled to start production in 2003. The components will be supplied from two Mexican plants. Castech currently supplies GM with aluminum cylinder heads for V-8 engines from its foundry in Ramos Arizpe.[114]

3.4.C Future Prospects for the Mexican and Canadian Engine and Engine Parts Sectors

As the trade statistics show, Mexican imports and exports of spark ignition engines have been relatively stable over the last five years, suggesting that any growth in Mexican engine assembly is roughly keeping pace with growth in Mexican assembly output. Given the existence of excess capacity in North America as well as throughout the world combined with more liberal Mexican rules that formerly drove exports, there is no reason to expect this trend to change dramatically.

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[113] Mexico News Items, March 2000.

[114] Mexico News Items, September 1999 and VAW Aluminum press release, August 28,1999. Mexican strength in aluminum casting has also shown itself in recent expansions in aluminum wheel production capacity. Both a Hayes Lemmerz/Grupo Desc joint venture and Superior Industries have begun or expanded aluminum wheel production in Chihuahua (Mexico News Items, Nov. 1999).

Capacity rationalisation in engine production is already under way. DaimlerChrysler has announced plans to close one engine plant in Mexico (Toluca) and one in the United States (Mound Road). It is hard to predict which, if any, of the remaining North American plants are particularly vulnerable, but the combination of a growing domestic market, low labour costs, skill in casting, and a reputation for high quality should allow the Mexican engine sector to fare future cuts reasonably well. Likewise, low (relative to the U.S.) labour costs and high productivity bode relatively well for the future of Canadian engine plants.

Engine parts have emerged as a recent Mexican strength. Again, Mexico's low labour costs, the high density and value of such parts which allows for economical shipping, and Mexico's proven record in aluminum casting bode well for the future of this sector in Mexico.

3.5 OTHER AUTO PARTS

Broadly speaking, Mexico's competitive strengths in international trade lie with those parts using high labour content, particularly parts that are not required on a just-in-time basis. These include parts such as seat belts, seat covers and the final assembly of automotive electrical and electronics components. Mexico's competitive weaknesses have been capital intensive parts, again particularly those that are relatively hard to ship, or those that are required on a just-in-time basis. Such parts include transmission and transmission parts and some body parts.

U.S. and Canadian statistics for trade in automotive parts with Mexico confirm this general picture. Table 3.8 below shows the Mexican export/import ratio for combined trade with the U.S. and Canada over the last five years. Over this period, Mexico has been a significant net exporter of radios, other electrical components (windshield wipers, signalling and lighting equipment and parts, starter motors and other ignition equipment and generators), safety belts, radiators, and steering wheels. Mexico has had relatively balanced trade in seats, brake parts, pumps, wheels, and spark plugs and ignition parts. It has run deficits in transmission parts, axles, bumpers, filters, and body parts.

Table 3.8: Mexico's Average Export/Import Ratios for NAFTA Autoparts Trade 1996–2000

Tariff Code	Product Description	Export/ Import Ratio
852721	Radio Receivers for Motor Vehicles - With Sound Recording Apparatus	12.40
852729	Radio Receivers for Motor Vehicles - Without Sound Recording Apparatus	8.52
870821	Safety Seat Belts	6.21
851240	Windscreen (Windshield) Wipers, Defrosters and Demisters	3.36
870891	Radiators for Motor Vehicles	3.18
851230	Electrical Sound Signaling Equipment	3.00
851220	Lighting or Visual Signaling Equipment NES	2.63
851140	Starter Motors, Dual Purpose Starter- Generators for Internal Combustion Engines	2.24
851180	Glow Plugs and Other Ignition/Starting Equipment for Internal Combustion Engines	2.12
851130	Distributors and Ignition Coils for Internal Combustion Engines	1.91
851290	Parts of Electrical Lighting, Signaling and Defrosting Equipment	1.76
870894	Steering Wheels, Steering Columns and Steering Boxes for Motor Vehicles	1.74
851150	Generators (Other Than Starter- Generators) for Internal Combustion Engines	1.70
940120	Motor- Vehicle Seats	1.24
870839	Brake System Parts NES for Motor Vehicles	1.07
841330	Fuel, Lubricating or Cooling Medium Pumps for Internal Combustion Piston Engines	0.95
870870	Road Wheels (Including Parts and Accessories) for Motor Vehicles	0.84
851110	Sparking Plugs for Internal Combustion Engines	0.80
851190	Parts of Electrical Ignition/Starting Equipment for Internal Combustion Engines	0.74
870893	Clutches and Parts Thereof for Motor Vehicles	0.62
870829	Parts and Accessories of Motor Vehicle Bodies NES	0.58
870892	Mufflers and Exhaust Pipes for Motor Vehicles	0.54
842123	Oil or Petrol Filters for Internal Combustion Engines	
870899	Other Motor Vehicle Parts NES	0.47
870831	Mounted Brake Linings for Motor Vehicles	0.43
870860	Non- Driving Axles and Parts Thereof for Motor Vehicles	0.38
842131	Intake Air Filters for Internal Combustion Engines	0.34

Table 3.8 (continued)

Tariff Code	Product Description	Export/ Import Ratio
870810	Bumpers and Parts Thereof	0.26
870840	Gear Boxes for Motor Vehicles	0.23
851120	Ignition Magnetos, Magneto- Generators and Magnetic Flywheels for Internal Combustion Engines	0.13
870880	Suspension Shock Absorbers for Motor Vehicles	0.12
870850	Drive Axles With Differential for Motor Vehicles	0.09
870710	Bodies for Automobiles (Passenger Carrying Vehicles or Motor Cars)	0.05

Source: CRA calculations from U.S. and Canadian trade data for non-engine autopart tariff codes from Statistics Canada and the U.S. Census Bureau collected by Industry Canada, Strategies database.

While the trade statistics confirm the general picture that exports of labour-intensive goods prevailed over 1996-2000, they do not reveal an underlying trend in exports. For that, we can use trade statistics to identify those parts sectors that are undergoing the most rapid growth in export and import activity. Table 3.9 lists those sectors for which average Mexican exports to the U.S. and Canada grew most between 1996-97 and 1999-2000.

Table 3.9: Parts Sectors Experiencing Greatest Percentage Growth of Exports from Mexico to the United States and Canada

Tariff Code	Part Sector	Ratio 1999-2000 Exports/ 1996-1997 Exports	1999-2000 Average Level of Exports (C$'000,000)
870840	Gear Boxes for Motor Vehicles	14.4	$257.8
851150	Generators (Other Than Starter-Generators) for Internal Combustion Engines	12.7	$114.3
870710	Bodies for Automobiles (Passenger Carrying Vehicles or Motor Cars)	8.8	$1.7
851110	Sparking Plugs for Internal Combustion Engines	6.1	$40.9
842123	Oil or Petrol Filters for Internal Combustion Engines	4.9	$30.2
851190	Parts of Electrical Ignition/Starting Equipment for Internal Combustion Engines	4.1	$137.2
870831	Mounted Brake Linings for Motor Vehicles	3.7	$19.9
940120	Motor Vehicle Seats	3.4	$25.3
851130	Distributors and Ignition Coils for Internal Combustion Engines	3.3	$66.2
841330	Fuel, Lubricating or Cooling Medium Pumps for Internal Combustion Piston Engines	3.2	$128.9
851140	Starter Motors, Dual Purpose Starter-Generators for Internal Combustion Engines	3.1	$151.1
870860	Non-Driving Axles and Parts Thereof for Motor Vehicles	2.7	$62.4
842131	Intake Air Filters for Internal Combustion Engines	2.6	$22.7
870850	Drive Axles With Differential for Motor Vehicles	2.3	$70.8
851220	Lighting or Visual Signaling Equipment NES	2.2	$275.8
870893	Clutches and Parts Thereof for Motor Vehicles	2.2	$30.0
851290	Parts of Electrical Lighting, Signaling and Defrosting Equipment	2.2	$504.8
870894	Steering Wheels, Steering Columns and Steering Boxes for Motor Vehicles	2.1	$498.0
870892	Mufflers and Exhaust Pipes for Motor Vehicles	2.1	$37.3

Source: CRA calculations from U.S. and Canadian trade data for non-engine autopart tariff codes from Statistics Canada and the U.S. Census Bureau collected by Industry Canada, Strategis database.

Table 3.9 reveals that while transmissions and parts have historically been a weak sector for Mexico, they are experiencing rapid export growth. Among its historically strong and large export sectors, Mexico has continued to show strong growth in electrical parts. Other sectors showing significant growth include steering wheels, filters, and spark plugs.

As Table 3.10 below shows, export growth from the U.S. and Canada have been marked in several sectors in which Mexico has been experiencing export growth as well, notably electrical parts. Presumably, this simultaneous growth in Mexican imports and exports reflects growing specialisation in Mexico in labour-intensive assembly of parts imported from the U.S. and Canada.

Table 3.10: Parts Sectors Experiencing Greatest Percentage Growth of Imports from the United States and Canada to Mexico

Tariff Code	Part Sector	Ratio 1999-2000 Exports / 1996-1997 Exports	1999-2000 Average Level of Exports (C$'000,000)
851120	Ignition Magnetos, Magneto- Generators and Magnetic Flywheels for Internal Combustion Engines	6.4	$2.6
870860	Non-Driving Axles and Parts Thereof for Motor Vehicles	4.2	$167.4
851190	Parts of Electrical Ignition/Starting Equipment for Internal Combustion Engines	3.8	$172.8
870893	Clutches and Parts Thereof for Motor Vehicles	3.5	$62.9
870831	Mounted Brake Linings for Motor Vehicles	3.2	$41.8
842131	Intake Air Filters for Internal Combustion Engines	3.2	$71.8
851130	Distributors and Ignition Coils for Internal Combustion Engines	2.6	$35.3
851220	Lighting or Visual Signaling Equipment NES	2.6	$106.6
851150	Generators (Other Than Starter-Generators) for Internal Combustion Engines	2.2	$49.7
940120	Motor Vehicle Seats	2.1	$19.8
851110	Sparking Plugs for Internal Combustion Engines	2.0	$36.2
870894	Steering Wheels, Steering Columns and Steering Boxes for Motor Vehicles	2.0	$277.9
870839	Brake System Parts NES for Motor Vehicles	2.0	$428.4

Source: CRA calculations from U.S. and Canadian trade data for non-engine autopart tariff codes from Statistics Canada and the U.S. Census Bureau collected by Industry Canada, Strategis database

3.5.A Future Prospects for the Mexican and Canadian Purchased Parts Sectors

(i) Electronics and Electrical Systems

Mexico is a leading supplier of many electronic parts and systems in North America. Canada, by contrast, is not a favoured location for the production of electronics. This can be seen clearly in the trade statistics for automotive radios. Canadian exports in the two tariff categories for automotive radios to the U.S. and Canada in 2000 were negligible: less than $1 million to the U.S. and nothing at all to Mexico. By contrast Canada imported nearly $400 million in automotive radios from the U.S. and over $300 million from Mexico in 2000. Mexico's share in this trade has grown spectacularly over the 1996-2000 period. While imports from the U.S. have been roughly constant at approximately $400 million, imports from Mexico have grown from just under $4 million in 1996 to over $300 million in 2000. Mexico's success in automotive electronics has paralleled its similar success in consumer electronics. Mexico now accounts for roughly 45% of Canadian (and 75% of U.S.) imports of colour televisions.

Mexico's early successes in electronics were built on its low labour costs. Final assembly of electronic components is highly labour intensive, and *maquiladora* plant production in Mexico offered a low-cost source of labour with which to assemble largely imported parts. Low (relative to the U.S. and Canada) labour costs continue to be a competitive advantage to Mexico, but with growing experience in electronics and the growing availability of trained workers, engineers and production experience, the Mexican electronics industry has increasingly shown capabilities in areas more sophisticated than final assembly.

Canada has historically not been a strong competitor in automotive electronics. Labour costs are not low enough to compete with Mexico or Southeast Asia for final assembly, nor has Canada been a source of enough innovation to pioneer new products and markets. These factors are unlikely to change in the immediate future, and help explain Visteon's decision to shut down its Markham, Ontario automotive electronics plant.

Low labour costs also largely lie behind Mexico's strong competitive position in many other automotive components involving electrical components, such as lighting, starter motors, generators, ignition systems, and windshield wipers. As Mexico's wages rise, however, Mexico will likely gradually lose its labour cost advantages to lower cost producers in Southeast Asia. This is also likely to be case in other forms of parts production, such as wiring harnesses that are very labour-intensive and can be shipped economically over large distances. Again, however, Mexico's growing technological capabilities and its still comparatively low labour costs should enable it to preserve and expand its share of North American production of these systems.

(ii) Steering and Suspension

Canada had no recorded exports of steering parts to Mexico between 1996 and 2000. Canada's imports from Mexico increased from $1.2 million to $24.3 million over this period. While the overall balance in U.S. trade with Mexico in steering parts has also shown a consistent deficit with Mexico over the period, this trade has shown substantial growth in both imports and exports. Between 1996 and 2000, U.S. imports from Mexico increased from $223 million to $482 million, while exports increased from $91 million to $350 million. Clearly, the increasing integration of Mexican automobile and parts production into a single North American market has caused this sector to be especially dynamic, resulting in increasing specialisation of both U.S. and Mexican producers. Mexico (and the U.S.) have established strengths in this sector. Canada, by contrast, has shown a large and increasing trade deficit in steering parts not only with Mexico but also with the U.S. Exports to the U.S. fell from roughly $83 million in 1996 to $39 million in 2000, while imports nearly doubled, from $526 million to $926 million.

While there are no tariff classifications summarising trade statistics for suspension system parts, this sector also appears to be one in which integration is bringing increasing specialisation. For example, San Luis Rassini, a Mexican firm, is the leading North American supplier of leaf springs, claiming a reported 62% of the market, which has grown with the increased popularity of light trucks.

(iii) Brake Systems and Parts

Like trade in steering parts, Mexican trade in brake system parts has seen substantial recent growth in both import and export volumes, clearly reflecting increasing specialisation across North America. In 1996, Canadian exports to Mexico of brake parts other than brake linings were approximately $3 million and imports from Mexico were approximately $43 million, producing a bilateral trade deficit of approximately $40 million. In 2000, the bilateral trade deficit stood at approximately the same level ($42 million), but exports had increased to just over $15 million, while imports increased to almost $58 million. Similarly, U.S. trade with Mexico in brake parts increased in both directions with relatively modest changes in the overall trade balance. U.S. trade with Mexico in trade parts was roughly balanced in 1996, with exports of approximately $155 million and imports of approximately $146 million. By 2000, exports had grown to $470 million and imports to $402 million. While Mexico is becoming an increasingly important source of brakes and brake parts to the North American market, with Mexican companies such as San Luis Rassini and U.S. companies like TRW expanding their Mexican production, the opening of the Mexican market has also brought export opportunities for both U.S. and Canadian firms.

Canada's bilateral trade deficit in brake parts with Mexico has been essentially constant, but it has shown modest increases in recent years with the United States. The ratio of Canadian imports to Canadian exports rose from roughly 1.3 in 1996 to roughly 1.6 in 2000, with exports in both years of just over $1 billion.

Given the large, relatively balanced, trade flows between both the U.S. and Canada and the U.S. and Mexico, the brake sector is one in which all three countries have competitive strengths. These trade statistics seem to indicate that Mexico represents as much a competitive an opportunity as it does a threat to Canadian brake production. Canadian trade with the U.S., however, dwarfs that with Mexico and in recent years has moved generally against obtaining products from Canada.

(iv) Plastic Interior and Body Parts

Mexico suffers in comparison to Canada and the United States in the production of plastic parts because of the thinness of the Mexican industrial base in supplying plastic resins. Plastic component manufacturers operating in Mexico interviewed by CRA report obtaining resins from a mixture of domestic and imported suppliers, although some of the domestic suppliers may, in fact, be supplying imported materials. Moreover, most plastic automotive parts are best produced close to the OEM customer's facility because few can be economically shipped over large distances due to their high volume/weight ratio. Mexico is therefore not a potential competitor to Canadian facilities for serving OEM facilities in Canada and the northern United States.

Increasing Mexican vehicle production is likely, however, to diminish prospects for Canadian exports to Mexico of finished plastic parts. Firms typically export such parts to their customers only when the piece volumes demanded by their customers are insufficient to justify the capital cost entailed in establishing a local production facility. With increasing volumes of vehicles being produced in Mexico, and with production runs increasing at modern Mexican assembly plants producing primarily for export, trends increasingly favour such investments.

4. INTERVIEW RESULTS

In this section, we report the results of our interviews of Canadian, American and Mexican assembly and parts manufacturers who have invested directly or considered such investments in Mexico. While the sample of companies interviewed was relatively small,[115] their responses with respect to the competitiveness and the investment climate of Mexico's automotive industry were remarkably consistent allowing for general conclusions to be drawn.

In total 13 interviews were conducted either over the phone or in person. Of these 13 interviews, five were with automotive industry participants located in Mexico, seven were with industry participants located in Canada, and one was with an individual located in the U.S. Of the 13 interviewees, five were participants in the auto parts sector, three of which are located in Canada and two in Mexico, seven were assemblers, three of which are located in Canada, two in the U.S. and two in Mexico. These assemblers included representatives of all three assemblers constituting the Big Three, as well as an European and Japanese based assembler. The remaining interview was with a Director General at the Mexican Ministry of the Economy. Three of the industry participants interviewed did not have investments in both Canada and Mexico. The auto parts sector participants who were interviewed are among the largest such producers in Canada and Mexico. They produce parts ranging from plastic components, axles, latching systems, clutches, glass moving systems, truck bodies, pistons, steel and aluminum wheels, transmissions and other mechanical systems.

In order to protect the identity of the interview participants, the responses are summarised rather than reported verbatim. In general, the type of manufacturing that takes place in the Mexican automotive sector can be divided into two types: the production of unsophisticated, labour-intensive parts such as wiring harnesses and seat covers, and manufacturing activity that is more directly comparable to that taking place in Canada such as vehicle assembly and the manufacture of more sophisticated auto parts, such as engines and transmission systems. The latter types of investment were the focus of the interviews as this is the area in which Canada and Mexico compete for investment. Furthermore, the former type of investment is beginning to wane in Mexico as Mexico's wage rates increase and its absolute labour cost advantage disappears to other developing countries, particularly Central America.

4.1 GENERAL CONCLUSIONS

While the reasons why assembly and auto parts manufacturers have located production facilities in Mexico differ, the experience of both sets of manufacturers has been similarly positive. In summary, the main conclusions from our interviews are as follows:

- The return on investment in Mexico is higher than that for similar operations in Canada and the U.S.
- In the case of OEMs, the two main impetuses for investing in Mexico are the lower unit labour costs and growing Mexican demand for automobiles.

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[115] This was primarily the result of finding that a number of the companies contacted did not wish to be interviewed, notwithstanding efforts of the APMA to encourage participation in our interviews.

- In the case of parts manufacturers, the main impetuses for investing in Mexico are the high costs of transporting certain types of parts and in the inability to effectively service Mexican OEM's just-in-time delivery requirements from a distance.
- While labour productivity may generally be lower in Mexico than in Canada as a result of the use of more labour-intensive technologies, given comparable capital investments, the Mexican labour force is at least as productive or more so than the Canadian labour force.
- In some important cases, the high levels of Mexican labour productivity is attributable to a more flexible work force compared to the Canadian work force.
- NAFTA has been important in simplifying the investment process, but it has not been the driver determining the investment.
- The free trade agreement between Mexico and the European Union (EU) (entered into July 1, 2000) is likely to favourably impact investment in the Mexican automotive industry in the long-run.
- Mexico has a competitive disadvantage in the production of certain inputs, particularly sheet steel, plastic resins, and large or technologically advanced pieces of capital equipment.
- Within Mexico, further industrial expansion in real and potential sites is hindered by shortages of water and an inadequate infrastructure in respect of utilities and local transportation.
- In the case of the OEMs, it was generally thought that investment in the Mexican automotive sector will increase in the long run while in the short run the location of existing excess capacity will largely determine the location of any new production.
- In the case of auto parts manufacturers, the location of new investment is largely dictated by the investment decisions of OEMs. Given the currently relatively high levels of automobile inputs imported from outside of Mexico, and the preference of OEMs to have parts obtained locally, it is generally thought that investment in the production of auto parts in Mexico will increase.

Historically, the OEMs have had production facilities in Mexico from as early at the 1930s. These investments increased considerably in the 1970s and then again in the 1990s. Both periods of positive investment growth were in response to positive indicators in the Mexican economy, in particular strong GDP growth in an atmosphere of pent-up consumer demand, and relatively lower manufacturing costs, largely driven by lower labour costs. Currently, about 75% of OEM production in Mexico is exported, mostly to Canada and the U.S., but also to South America and the Caribbean. There are currently virtually no exports to Europe by the Big Three but this may change with the free trade agreement between Mexico and the EU. Mexican labour costs, including the costs of all associated benefits, are currently about one-fifth to one-quarter the cost in Canada.[116]

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[116] Other data suggest that the relative wage rate in Mexico is even lower than one-fifth of the rate in Canada. The discrepancy between these data and the information provided by the respondents is likely because general data include wages paid to relatively unskilled workers in labour-intensive sub-sectors such as wire harness and seat cover production.

Automotive sector labour costs are, however, steadily increasing at an annual rate of 3%-4% more than inflation. This is a result of high demand for labour in the main production areas of Mexico. This high demand has resulted in the migration of workers to industrial clusters outside of Mexico City from other parts of Mexico. Worker turnover, while a potential problem for firms seeking lower skilled workers receiving entry-level wages, is not a major problem for OEMs, who pay their workers generously by Mexican wage standards.

While low labour costs and high anticipated demand were the drivers of OEM investment in Mexico, auto parts manufacturers were compelled to invest in Mexico in order to effectively serve their OEM client base. All of the auto parts companies interviewed sold almost all of their output domestically to a Mexican-based OEM. Generally, only companies that manufacture labour-intensive parts like wiring harnesses and seat covers produce for export. These types of products are exported almost exclusively to the U.S. With respect to the parts companies producing for Mexican-located OEMs, the fact that a move to Mexico has also meant lower labour costs has simply been an additional benefit of the investment. Much of this investment has gone to the production of parts that are uneconomic to transport due to their weight or bulk. If a manufacturer of one of these types of products locates in Mexico, in order to remain competitive, the other manufacturers of these products must also locate in the vicinity of the OEM or else be unable to compete as a result of the additional freight cost incurred. Manufacturers of these types of heavy or bulky parts are also under pressure from the OEMs to reduce costs of production by locating nearby. An additional consideration for many parts manufacturers is the importance of just-in-time delivery. OEMs for certain types of products require a 90 minute delivery time, which means that the driving time must be only 20-25 minutes. As a result, capital-intensive products that have a high-value to transportation cost ratio are also increasingly produced in Mexico.

Manufacturing in Mexico tends to be somewhat more labour-intensive. This is largely because labour is so much cheaper compared to Canada but also, in some instances, because of the relatively high cost of major capital inputs, and in other cases because Mexican operations are built on a smaller scale than those in the U.S. or Canada, which is sufficient to meet Mexican demand. Large or high-tech pieces of equipment are unavailable in Mexico and hence are almost all imported from outside of Mexico. This results in high freight and installation costs for such equipment.

Despite this, green-field Mexican production facilities normally incorporate the latest in production technology and the best practices of existing facilities. This is done in order to help ensure that the quality of product manufactured in Mexico is equal or better than that produced elsewhere. The internal standards of the companies interviewed do not allow for lower quality of product, regardless of the location or mode of production. Vehicles produced in Mexico compete in the international market and thus they must be the same or better quality compared to vehicles produced outside of Mexico. This policy has been successful because Mexico's quality and, furthermore, its reputation for quality production is approximately equal to that of Canada. The decision to invest in capital-intensive production facilities entailing the latest technologies is also a result of the adoption of a long-run view that recognises that Mexico's labour cost advantage will eventually erode. Up-to-date facilities will allow Mexico to remain competitive even in the face of higher labour costs.

While the cost of labour is an important consideration in investment decisions for vehicle assembly, respondents indicated that labour only accounts for 10%-15% of the total cost of assembling a vehicle. So while it is an important factor in investment decisions, it is not always decisive. There are a variety of inputs in addition to labour that are comparable or cheaper in Mexico than in Canada.

The general consensus is that the cost differential of these inputs is not a driving force behind investment decisions. Rather, the greater flexibility of the Mexican labour force and the mode of labour organisation are regularly pointed to as an important benefit to producing in Mexico. At least in some important instances, Mexican workers are generally more able and willing to do a number of different types of tasks relative to the Canadian work force and particularly when compared to the U.S. This greater flexibility is at least in part attributable to the differences in the work rules in unionised Canadian plants compared to unionised plants in Mexico. While essentially all automotive plants in Mexico are unionised, compared to the vast majority of assembly workers in Canada and about 40% of the Canadian auto parts work force, Mexican unions do not generally concern themselves with work rules, job classifications and job security, and, as such, no such clauses exist in their labour contracts. As a consequence, Mexican workers may be regularly moved from one work station to another. In addition to directly increasing the efficiency of production, this has the added benefit of increasing the worker's knowledge of the production process. It also tends to improve the worker's dexterity and reduces ergonomic strains, as well as alleviating boredom. Respondents noted that Canada's work force is somewhat more flexible than that in the U.S. as the result of less strict interpretations of union work rules on the shop floor. Auto parts manufacturers, which have a lower rate of unionisation, noted less discrepancy between Mexico and Canada with respect to labour flexibility than OEMs; Mexico. Nonetheless Mexico was still felt to lead Canada in terms of labour flexibility, although by a smaller margin than in the case described by OEMs.

Another advantage to the Mexican work force is the more efficient system of labour organisation implemented at the plants. With green-field investment, manufacturers were able to implement best practices with respect to technological processes as well as best practices in terms of labour organisation. One OEM respondent, for example, reported that its newest Mexican assembly plant can "out Japanese the Japanese" in the successful implementation of team concepts and lean production. Workers are organised into teams of four to six, including one team leader. The team leader, who is chosen on the basis of merit as opposed to seniority, assures the product quality, worker safety and training and worker assistance. As a consequence of this system of organisation, the need for management supervision is reduced so that there are fewer plant and quality supervisors. This OEM is exploring avenues of introducing such methods of work force organisation to Canada and the U.S., a task that it expects to be more difficult given the long history of the current mode of labour organisation.

The net result of the high labour flexibility, the efficient form of labour organisation, in addition to what is generally seen as an effective, hard-working labour force, is that many respondents felt that Mexican labour productivity was at least as high or higher than that of the Canadian work force given the same amount of capital.

Investment in Mexico is not without difficulties. The main difficulty cited in interviews was high administrative costs due to a lack of transparency and the large number of rules and regulations. With respect to administrative costs, NAFTA's main impact has been to help clarify the investment process and to provide a more secure environment for foreign direct investment. It has also acted to reduce long-run uncertainty resulting from unanticipated changes in regulations and the legal framework. To deal with this, the Mexican government over the last few years has undertaken to reduce the number of rules and regulations governing investments in Mexico. Nonetheless, the investment process can still be slow, cumbersome and lacking in transparency. Higher administrative costs are more likely to be an investment impediment to smaller companies. Larger companies are better equipped to overcome these and, while it is a source of increased costs, it is not one that is sufficiently large to deter entry.

A shortage of water may, however, eventually prove to be a more serious deterrent. Water is generally in short supply, such that larger plants frequently must drill their own wells at great expense even though property rights do not include water rights. Having drilled for water, companies must also undertake the cost of cleaning it and handling any resulting hazardous waste. At this point in time, this additional cost is not a deterrent. There is a possibility, however, that with increased investment in the region and the consequent increased demand on the limited water supply, water costs may become prohibitive.

Despite whatever downsides to investing in Mexico there may be, the net result of the lower labour costs, an effective labour organisation, new plants incorporating the latest technologies and practices, and a competitive environment for parts makers not burdened by excess existing capacity is that returns on investment in Mexico are at least as high or higher than those in Canada. For this reason, in addition to the anticipated continued increase in demand for automobiles in Mexico, the general prognosis of future investment in Mexico is very favourable.

The main area in which new investment is likely to take place is parts manufacturing. There continue to be a large percentage of inputs to vehicle assembly in Mexico that are imported. To date, the volume of demand for some of the inputs has not been sufficiently high to justify investment in Mexico. With increased output by the OEMs, however, more and more investment to produce parts in Mexico is likely to take place. This is not as clearly the case with respect to OEMs.

Given the cost of investing in a green-field assembly operation, despite high returns on Mexican investments, OEMs will likely first consider where there is currently excess capacity, then consider where it is least costly to expand or retool an existing facility before determining whether to invest in a new production facility. Mexico may well prove an attractive place in which to make strategic investments to increase capacity on the margin by "debottlenecking", since the climate for large-scale investment in capacity for the North American market is not favourable. Once excess capacity is reduced, should it be determined that green-field investment is opportune, Mexico is likely to appear very attractive.

As previously noted, the effect of NAFTA on investment in Mexico has not been that significant in augmenting total levels of investment. Rather NAFTA has been important in expediting the investment process. Once NAFTA is fully implemented and remaining duties between Canada and Mexico disappear, NAFTA is likely to further improve the speed of the investment process.

The impact of Mexico's free trade agreement with the EU on investment is also likely to be positive although there is the possibility that it will reduce the speed of investment in component manufacturing in Mexico in the short run. Once duties and other trade barriers fall between Mexico and the EU, European vehicle and parts manufacturers may see it as an opportunity to profitably increase production of certain components in Europe, taking advantage of existing excess capacity. This would likely only benefit those vehicles destined for Europe since such exports may violate regional content clauses as in the case of the vehicles exported to North America. These parts would then be exported duty-free for use in Mexico. Only once excess capacity in Europe is reduced would increased component production and consequent investment in Mexico be considered. From a longer-run perspective, the impact of free trade with Mexico is likely to have a positive effect on investment as the European automotive companies view Mexico as means of accessing the NAFTA market. In this sense, it would appear that Mexico is positioning itself as a free trade hub connecting the EU, NAFTA and Mercusor regions.

Notwithstanding the above, there are certain inputs to production that are not effectively produced in Mexico currently and are likely to remain so for the foreseeable future. This includes large pieces of capital equipment, resins, sheet steel and light-weight metals. The demand for large pieces of capital equipment, such as stamping equipment of more than 600 tons, is relatively small so that in order to achieve scale economies, it makes sense to have this equipment in one or a few locations despite the consequent high cost of transportation. As such, this type of production is unlikely to move to Mexico and whatever new investment that takes place will likely be at existing facilities in Canada and the U.S. Currently, resins used in the manufacturing of plastic parts are imported mostly from the U.S. Given the magnitude of Mexico's oil industry, this is one primary input area in which it may make sense to invest in Mexico. In the case of steel, the quality of steel produced in Mexico is quite low such that most of it is imported. However, given the high cost of transporting steel, the steel imported to Mexico is sourced from steel mills closer than those located in Canada so that increased demand for steel in Mexico is unlikely to have an effect on Canadian facilities. Canada does, however, have an absolute advantage in the smelting of certain light-weight metals used in vehicle production, such as aluminum and magnesium.[117] This comparative advantage is attributable in part to the proximity of aluminum and magnesium mines and the relatively low cost of electricity in Canada. Experimental technologies that permit parts creation at "first melt" or which allow stamped parts to be made directly from sheet rather than blanks might provide a further competitive advantage to producers located near raw material sources. Transporting such products versus sheets entails a premium but this type of production technology results in other savings mainly in the form of lower energy costs. GM is encouraging the federal and Quebec governments to help develop these technologies.

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[117] Monterrey, a major auto part manufacturer located in Mexico, does produce aluminum monoblocks.

4.2 SUMMARY OF INTERVIEWS

4.2.A Return on Investment

All the respondents indicated that returns on investment were at least as high as in Canada or higher. In some instances, the respondents indicated that returns on investment were considerably higher in Mexico, in the order of 2-3 times the return on assets earned in Canada and in the range of 2.5 times Canadian net income margins. These higher returns were largely attributed to a lower cost but equally effective (if not more effective) labour force.

4.2.B Cost Comparison of Main Input Costs

Respondents indicated how the costs of main production inputs compared across Canada and Mexico.

Land Costs

The responses as to how land costs across the two countries compared varied considerably from Mexican land being cheaper, to being about the same, to being considerably more expensive. The variance in response is likely attributable to the time at which the firm in question made its investment. Historically, the Mexican government made public land available to investors in exchange for contributions to the local community in which the land was located. This type of program to stimulate industrial development is no longer seen as necessary. As a consequence, land acquisition costs have increased considerably such that today land tends to be more expensive than in Canada. Some interview respondents pointed to the difficulty of establishing clear title to land as an impediment in investing in Mexico.

Building and Construction Costs

Building and construction costs are generally lower in Mexico. This is in part the result of the lower cost of labour in Mexico, but also the type of building required in Mexico is cheaper than that required in Canada as there is no need for heating systems, insulation, and reinforcements for the roof to withstand the weight of snow. Furthermore, due to the nature of the desert floor in many parts of Mexico, the foundations of Mexican buildings do not have to be as deep as those in Canada. One respondent noted, however, that there can be unforeseen costs resulting from shortcuts taken during construction. These shortcuts can have serious cost consequences if not caught early. As a result, even well-established construction companies have to be very closely supervised, increasing monitoring costs.

Competitiveness Factors for Attracting and Maintaining Automotive Support: Comparison Between Canada and Mexico

Cost of Capital

The cost of borrowing in Mexico is considerably higher than in Canada. Most large companies, however, borrow on the global market, which is driven by U.S. lending rates. As a result, in most instances the actual cost of capital incurred by companies investing in Mexico is similar to the costs they would incur in Canada.

Cost of Infrastructure and Utilities

The cost of water and electricity in Mexico is higher than in Canada. Companies investing in Mexico frequently have to drill their own wells for water and make investments in power-generation. The alternative to making these investments directly is establishing plants in industrial parks where the high cost of infrastructure is reflected in high rental fees. Public transportation and road conditions are generally in poor condition in Mexico. Companies frequently have to provide transportation for their workers due to poor public transportation. In some instances, companies have also had to pave roads due to their poor condition. For companies located off the "NAFTA highway", poor road conditions and longer border delays can be a serious cost disadvantage. One respondent also noted that Canada's road infrastructure, particularly in the Toronto-Windsor corridor, was not keeping pace with the demands placed upon it.

Cost of Labour

Labour, including all benefits, in Canada is four to five times more expensive than in Mexico. Annual wages in the automotive sector have, however, been increasing by about 3%-4% above inflation over the last few years.

Corporate Taxes

The respondents generally were unaware of corporate tax rates in Mexico. Of those respondents who were familiar with the rates, the responses varied from being less expensive in Mexico to more expensive. The variance in these responses may be attributable to differing opportunities for deductions. Generally, corporate tax rates in Mexico and Canada are comparable but there are greater opportunities for deductions in Canada than in Mexico such that overall, corporate taxes tend to be somewhat lower in Canada.

Amortisation and Depreciation Costs

These costs are internal to the firm and consequently tend to be the same across both countries. Given this, one interviewee noted that cost of capital allowance schedules for tax purposes were longer in Mexico.

Labour Training Costs

The training requirements in Mexico were somewhat higher than in Canada. However, the cost of this training was minimal as the Mexican government has a number of easily accessible programs that reimburses companies their training costs.

Administrative Costs

Administrative costs are considerably higher in Mexico than in Canada as a result of a large number of non-transparent rules and regulations. While this situation has improved with NAFTA, the cost differential is still substantial.

Other Costs

In making investments in Mexico, companies can face a number of unforeseen costs mainly in the form of unexpected land claims, litigation and security costs.

Generally, of all the inputs noted above, the ones that had impact on the respondents' investment decisions were the lower cost of labour in Mexico and higher administrative and other costs. In most instances, lower labour cost combined with more effective labour in conjunction with, in the case of auto parts manufacturers, the need to be close to the OEMs and, in the case of the OEMs, the appeal of pent-up Mexican consumer demand, overrode any other cost considerations or differentials when making investment decisions. In some instances, for certain facilities, investors did turn away from Mexico after encountering administrative problems when attempting to make their investments.

4.2.C Imported Inputs

While there has been an important movement in Mexico to produce more inputs within the country, a very high percentage of inputs to assembly are still imported. About 75%-90% of tooling is imported from Canada and the U.S. and another 5%-7% is imported from Japan and Europe. This is beginning to change with the increased number of auto parts manufacturers locating in Mexico. As noted earlier, the movement of parts manufacturers to Mexico is largely in response of pressures from assembly plants. This is the case not only because of the need for just-in-time delivery and the desire to avoid additional freight costs, but also to diffuse labour cost savings throughout the production chain. While labour is an important cost component in assembly, it only accounts for 10%-15% of the total assembly cost. There are considerable additional total production cost savings that could be made if the benefits of the lower labour cost in Mexico could be spread throughout the production chain, particularly in the production of parts. As a consequence, the Mexican federal government's current main focus is the promotion of Tier II and Tier III manufacturers.

In cases where parts manufacturers have located in Mexico, most of the inputs to these production facilities, particularly in the case of metals and plastics, tend to be imported. With the exception of possibly resins for plastic, it is likely that these primary inputs will continue to be imported as Mexico has a comparative disadvantage in the production of metals.

Both OEMs and auto parts manufacturers import large pieces of capital equipment, such as stamping presses that weigh more than 600 tons and paint lines, and specialised or high-tech machinery, such as hydro-forming lines. The volume of demand for this equipment is relatively small so that in order to achieve scale economies, it makes sense to have this equipment produced in one or a few locations in order despite the high freight costs associated with transporting this type of equipment.

With respect to labour inputs, high level management is generally imported. Historically, up until the early to mid-1990s, middle-management and certain skilled workers, such as engineers, were also imported. This is no longer the case. All respondents noted that skilled workers, included well-educated, capable engineers, are available within Mexico. Where labour inputs are still imported, these tend to be imported on a strictly short-term basis to provide training.

4.2.D Labour: Productivity, Flexibility, Skills, Turnover, and Training

Labour productivity figures in Mexico tend to be lower than in Canada because the production facilities, while using the latest production technologies, tend to be less capital intensive. The main difference in the production processes is the considerably lower use of robots in Mexico. However, where robots are necessary for precision and safety, Mexican production plants use them in equal number to facilities in Canada and the U.S. Furthermore, production facilities in Mexico tend to be less capital-intensive not only because of a decision to substitute labour for capital but also because the type of vehicle chosen for manufacturing in Mexico can be effectively assembled using labour-intensive processes. This is particularly the case for pick-up trucks.

Controlling for this difference in capital usage, the respondents indicated that labour is at least as or more productive than Canadian labour. This high rate of productivity was attributed to greater labour flexibility and a skilled, young, motivated labour force that takes pride in the quality of its work. Productivity in Mexico is also high in some facilities because the newest plants incorporate more modern technologies, layouts and work flow processes than in Canada which has older plants. In addition, turnover at Mexican plants that provide wages and other incentives to retain their workers are low, as is the cost of training as these costs are largely reimbursed by the Mexican government.

Most respondents remarked on the benefits to be had from the flexibility of the Mexican labour force. As previously noted, the rate of unionisation is considerably higher in Mexico (close to 100% in the automotive sector) compared to in Canada (60% in the automotive sector as a whole). Despite the higher unionisation rates in Mexico, most respondents noted that labour was generally easier to work with in Mexico than in Canada. This was the case, although to a lesser extent, even when comparing non-unionised plants in Canada to unionised plants in Mexico. The positive relations with Mexican workers were largely attributed to their flexibility. As noted earlier, Mexican unions generally do not concern themselves with work rules, job classifications and job security, and, as such, no such clauses exist in labour contracts. As a consequence, workers are regularly moved from one work station to another. In addition to directly increasing the efficiency of production, this has the added benefit of increasing the worker's knowledge of the production process while it tends to improve the worker's dexterity, reduce ergonomic strains, and alleviate boredom. Mexican unions work rules are also not predicated on a system of seniority. This further grants employers greater flexibility to promote workers on the basis of merit rather than years of service. As one interviewee noted, "the labour contract in Mexico is not a restrictive covenant." Furthermore, Mexican workers very rarely go on strike. CTM (Confederación de Trabajadores de México), Mexico's largest labour federation and the union to which most automotive workers belong, occasionally calls for strikes but there have been virtually no days lost due to strikes in the last five to six years.

Other intangible benefits of the Mexican work force mentioned by respondents include its youth, motivation, commitment, quality consciousness, and hand dexterity. In contrast, the Canadian work force was noted as being older and less flexible. On respondent noted that the fact that a large portion of the Canadian work force is reaching retirement age might facilitate the migration of plants. In terms of technical skills, Mexico had lagged behind Canada but now the skill sets of workers are similar in both countries. The skills of entry-level engineers in both countries was particularly noted, although Mexico does suffer a relative shortage of older supervising engineers with extensive manufacturing experience relative to Canada, a disadvantage that will likely fade over time. The skills of Mexican workers are attested to by GM's and Delphi's decisions to establish technology centres in Mexico.

In contrast to the above, one respondent noted that Canadian workers are also quite flexible and demonstrate engagement in their work and a willingness to do incidental work. This respondent speculated that Canada's reputation for labour inflexibility may stem from the very public and vocal style of the CAW, which has a propensity to take policy and workplace disputes to the media. CAW job protection provisions are considerably less draconian than those in U.S. contracts. There is no rigid requirement to hire additional workers as production increases, for example. This allows Canadian plants to "ride the attrition curve" to attain optimal staffing levels.

Turnover can be a problem in Mexico with respect to low-skilled workers at very labour-intensive plants (for example, wiring harnesses) that pay relatively low wages. These workers will change jobs in response to small differences in wage rates such that it is not unknown for plants to lose entire shifts. The relatively low wages in these types of plants is a reflection of the competition Mexico faces for this type of labour-intensive work from Central America, Thailand and China, or in some cases competition from the lower labour cost regions in the south of Mexico. Among higher-skilled workers at more capital-intensive facilities, turnover is generally not a problem as companies will pay wages that assure workers are retained. Assembly plants generally pay higher wages or provide other incentives such as subsidised housing with the result that turnover can be as low as 2% a year.

Somewhat more training is required for Mexican workers than their Canadian counterparts. This training tends to be provided by the manufacturer in on-the-job programs, the cost of which, as noted by most respondents, is in many cases fully subsidised by the Mexican government. The ease with which such training programs are reimbursed by the government was also noted by many respondents.

4.2.E Environmental Regulations and Safety Standards

Environmental regulations and safety standards are essentially the same in Mexico and Canada. Many respondents further indicated that they are particularly vigilant in upholding environmental standards in Mexico as they perceive that authorities tend to target foreign companies when investigating violations. Penalties for environmental violations in Mexico were considered by these respondents to be substantial.

With respect to safety standards, one respondent noted that even in instances where Mexico has lower safety standards, companies have a strong incentive to maintain high standards because social security premiums in Mexico are based on a company's safety record. A good record can result in substantial savings to a company. As with enforcement of environmental regulations, however, one respondent noted that Mexican companies sometimes do not abide by national safety standards, which lowers their production costs and thus renders it somewhat more difficult for foreign companies to compete effectively. While the Mexican companies are subject to the same standards, the authorities are perceived to be less vigilant in enforcing these standards in Mexican-owned plants.

4.2.F Free Trade: NAFTA and EU

None of the respondents felt that NAFTA had a major impact on their ultimate investment decisions but most did indicate that, having made the decision to invest in Mexico, NAFTA eased the process. This was accomplished through a streamlining of the rules and regulations, an increase in transparency, greater assurance that there would be no unanticipated changes in governing rules, and generally a more secure environment for foreign direct investment. With respect to auto parts manufacturers, the full implementation of NAFTA increases the appeal of investment in Mexico and some companies are planning that their investments coincide with the disappearance of the last of the duties. However, even in these instances, NAFTA was not a deciding factor in whether or not to invest in Mexico.

The respondents anticipate that the impact of the free trade agreement between the EU and Mexico is, at least in the long run, likely to be positive as it will position Mexico as a free trade hub. The appeal to European companies of Mexico as an investment location will increase as investment in Mexico will provide access to the NAFTA and Mercusor regions. Post free trade these investments will not entail any additional duty or other trade barriers when importing inputs to production, such as capital equipment. One respondent noted that this, in the short run anyway, may slow down the trend towards increased input production in Mexico. Generally, before green-field investments are considered, it makes the most sense to increase production in locations with excess capacity. Such excess capacity currently exists in Europe.

4.3 THE FUTURE OF INVESTMENTS

In the short run, given the extremely high cost of green-field entry into vehicle production, the location of new production is largely dictated by the location of existing excess capacity and any retooling costs (and, in the case of Big Three facilities in the U.S. and Canada, labour cost commitments) associated with this capacity. Once investments are in place, they are not normally walked away from. The location of auto parts manufacturing facilities meanwhile are largely dictated by the location of OEM facilities. Given this, the respondents generally felt that Mexico was well-positioned for new investment relative to Canada. This was particularly the case for auto parts, an area in which Mexico currently lags, given the amount of vehicle production carried out. Since the location of auto parts production follows the location of the OEMs, investment in auto parts production is not at the expense of investments that would otherwise have been made in Canada. Nonetheless, any investments by auto parts manufacturers in Mexico will likely affect the demand for these inputs currently produced at Canadian facilities. This demand is only, however, a relatively small portion of total output so that, given the current level of demand from Canadian-located OEMs, a reduction in exports to Mexico should not have a large impact on Canadian auto parts facilities.

With respect to OEMs' facilities, one respondent noted that the growth of the Mexican automotive industry would most likely be at the expense of the U.S. industry, as the U.S., relative to Canada, is characterised by ageing assembly plants and difficult labour conditions. Production in Canada, in contrast, is likely to continue at current levels. This is partly because Canadian facilities tend to produce vehicles, such as mini-vans and pick-ups, that are less subject to changes in the business cycle, and in part because Canada is a cheaper location for production relative to the Northern U.S. and is well-positioned to transport final production into the U.S. market.

In contrast, another respondent noted that Canadian production is not immune to the effects of production rationalisation in North America. The plants without new committed products (for example, the GM plant in Ste. Thérèse and DaimlerChrysler's Pilette Road plant) are potentially the most vulnerable. In addition, Canadian production by Japanese manufacturers may be more vulnerable to displacement by imports than that from the U.S. With a few exceptions, the Honda and Toyota vehicles produced in Canada are also produced elsewhere, making it possible to shift production to Japan or the U.S. Politically, it is easier for the Japanese to increase exports into Canada than it is to increase them to the U.S.

5. POLICY IMPLICATIONS

In this section, we provide a brief summary of our findings as to why automotive firms are investing in Mexico and the implications of such investment for the Canadian industry. We then discuss some insights for Canadian policy that can be gained from our findings.

5.1 WHY ARE FIRMS INVESTING IN MEXICO?

Interviews with government, trade association, and company officials in Mexico, Canada, and the U.S. provide a remarkably consistent message explaining why firms are choosing to send a disproportionate share of new automotive investment to Mexico. For North American firms the driving factors to date have been two:

- Low labour costs and equivalent productivity levels in a very flexible work environment.
- Growing Mexican motor vehicle production, fueled by the integration of Mexican production into the North American market and rapid current and expected growth in Mexican vehicle sales.

For the immediate future, these two factors will continue to spur investment in Mexico.

A third factor, identified by a number of respondents as a potential stimulus to further investment, is Mexico's free trade agreement with the EU, the network of other free trade agreements it is building throughout the Americas, and the potential for a trade agreement with Japan. Mexico is seen as an emerging trade hub between the EU, NAFTA, and major Latin American markets, and may attract a substantial share of North American investment from European (and potentially Asian) companies seeking a low-cost, duty-free site for serving markets throughout the world. The first companies to benefit from these emerging relationships will be the European OEMs with a Mexican manufacturing presence (Renault, through its control of Nissan, and Volkswagen) but DaimlerChrysler, GM, and Ford may also seek to take advantage of opportunities for increased transatlantic trade in parts and finished vehicles. Moreover, potential new entrants into North America, in either parts or vehicle assembly, will certainly regard Mexico's extensive free trade links as a further reason to look to Mexico as an alternative to the U.S. or Canada.

5.2 IMPLICATIONS FOR THE CANADIAN AUTOMOTIVE INDUSTRY

The growth of the Mexican automotive industry should not be disastrous for the Canadian automotive sector. This is clear for the Canadian assembly sector. While we expect production of vehicles in Mexico to continue to increase over the next decade, we do not expect that any such increase will come at the expense of particular Canadian production. Domestic demand growth in the Mexican market should be sufficient to absorb any increase in overall North American capacity arising from the marginal additions to Mexican capacity OEMs can be expected to make. Given the high degree of sunk capital investments in existing U.S. and Canadian facilities, as well as the costs of labour guarantees, it makes little sense for manufacturers to open Mexican plants solely for the purpose of replacing existing capacity elsewhere in North America. Our interviews with automotive OEMs confirm this view. Respondents indicated that when looking to add capacity or to source new vehicles, their first option will always be to look at the costs of retooling or making marginal additions to capacity at existing plants. Nonetheless, some plants may be closed as existing capacity is rationalised. As some existing capacity in North America is rationalised, Canada should fare reasonably well as a source of production. Labour costs at Canadian plants compare very favourably with those in the U.S., as do the records of Canadian plants for high productivity and high quality.

In the parts sector, most of the firms that we interviewed were choosing to invest in Mexico to serve their OEM customers located there. As OEMs are relying increasingly on their suppliers to take charge of engineering and logistics functions as well as component production, OEMs are taking an increasingly global approach to purchasing. Firms that wish to compete for OEM business need to be prepared to meet OEM's parts requirements throughout North America, if not the world. Thus, Canadian parts manufacturers that wish to retain OEM business in the U.S. and Canada must also be prepared to meet the parts needs of OEM facilities in Mexico. The growth of the Mexican vehicle market, the increase in the length of Mexican product runs, and the liberalisation of the Mexican parts industry has meant that the most economical way to meet many of these parts needs is to establish production facilities in Mexico. For the most part, these facilities export little. Moreover, if it were economical to transport these parts long distances, these firms would have seen little need to go to Mexico in the first place. Many of these facilities, however, represent potential export markets for Canada, as Mexican producers cannot currently meet most of Mexican OEMs' capital equipment and some of their material input needs.

In contrast to the above, as we have previously noted, there exists another class of Mexican parts facilities consisting of facilities producing relatively labour-intensive parts primarily for export. The list of such parts has expanded beyond a narrow list encompassing the very most labour-intensive activities, such as the production of wiring harnesses, the final assembly of electronic components, and the sewing of automotive seat covers to include more moderately labour-intensive sectors such as aluminum casting and brake production. The expansion of these sectors, and the post-liberalisation emergence of a more competitive domestic parts sector in Mexico may potentially threaten some component production in the U.S. and Canada. However, it also creates opportunities for Canadian producers. As Mexico becomes more fully integrated into the North American automotive components value chain, opportunities arise for Canadian producers to specialise in more capital- and material-intensive production processes, while leaving the most labour-intensive activities to be done in Mexico. This ongoing process of specialisation probably explains the large growth in two-way trade in many parts sectors between Canada and Mexico and especially between the U.S. and Mexico.

5.3 POLICY IMPLICATIONS

In our view, there is little that Canadian policy can do to reverse the primary trends directing automotive investment to Mexico. Canadian firms cannot expect to sell parts to OEM facilities in Mexico that are most economically produced close to Mexican assembly plants, although they can compete vigorously to supply Mexico with raw materials and inputs – steel, aluminum, plastics, and especially tooling and other capital equipment. Canada certainly cannot expect to fight Mexico on low labour costs – even Mexico will likely lose some business to lower wage Asian and Latin American countries for the most labour-intensive products.

What Then Can Canada Do?

First, it is important for government authorities to remember that even with the growth of Mexican assembly activity, the main locus of North American automotive production will continue to reside along the Highway 401 – Highway I-75 corridor linking Toronto and the U.S. Midwest and Southeast. The presence of large sunk investment costs, the costs of labour guarantees, and the substantial benefits assemblers gain from close proximity to well-established suppliers (and vice-versa) are all factors that will work to keep the Highway 401 / Highway I-75 corridor the main source of North America's automotive production even as Mexican production grows on the margin.

Even if they cannot compete with Mexico on the basis of low labour costs or to serve Mexican assembly plants, Canadian parts production facilities are potentially well-placed to serve assemblers in the Highway 401 / Highway I-75 corridor. With the increased importance of just-in-time inventory systems, and the strength of Canadian manufacturing in many parts manufacturing that cannot economically be shipped large distances, such as plastic parts and metal stampings, the core market for many Canadian automotive parts is not threatened by Mexican production. As Canada still enjoys substantial labour cost advantages over the U.S., and a reputation for high productivity and high quality, one logical reaction to the loss of some business to Mexico is to increase promoting Canada as a logical place to manufacture the kinds of parts that Mexico cannot economically produce and ship to the U.S. industrial heartland.

Increased emphasis on producing and supplying "just-in-time" and other parts for which transportation costs serve as a barrier to Mexican plants seeking to serve U.S. and Canadian customers will require Canada to pay close attention to its own transportation infrastructure. One of the respondents identified congestion in the Toronto-Windsor corridor and the havoc it can play with tight production schedules as a potential disincentive for locating production in Canada. Improvements to transportation infrastructure within the corridor may thus be a crucial part of any strategy designed to increase Canada's share of producing those parts where U.S., and not Mexican, facilities are its primary competitors. Such transportation improvements would also strengthen the position of Canadian assembly facilities in attracting future high-volume product programs.

Another potential role for Canadian government policy is to undertake policies that promote innovation. It is clear that Canada cannot compete with Mexico for very labour-intensive production in mature parts production technologies. Labour cost, however, is not the only, or even principal, cost of production for most auto parts manufacturing. Pioneering new technologies with the potential to reduce material or other costs or to improve quality could change the competitive margin between Canada and Mexico and between Canada and other countries that currently base their cost advantage on low labour costs.

Innovation not only brings the rewards of direct returns to the innovator in the form of manufacturing profits and technology royalties, but may also open opportunities for Canadian production workers. Innovators frequently pioneer commercial production close to home so as to be able to readily control and monitor technological development, creating new opportunities for skilled workers and engineers. The challenge, however, to the innovating country is to hold on to production once a technology matures. In the long run, competition and the profit motive will lead production jobs to migrate to the lowest cost production locations, irrespective of the country that pioneered the innovation. If everyone has access to the same cost-reducing technology, then low labour cost countries may come to dominate production even as other costs are reduced.

This suggests that a particular focus of any Canadian policy package focused on promoting innovation in the automotive sector should look to take advantage of some of Canada's ongoing sources of competitive advantage. One potential example of such an advantage has already been mentioned in the section of this report discussing interview results: Canada's absolute advantage in the production of lightweight materials. Worldwide concerns over global warming and other competitive pressures are putting increasing pressures on automotive manufacturers to find ways to improve fuel efficiency by, among other strategies, cutting vehicle weight. Substituting aluminum (and to a lesser extent magnesium) for heavier materials is one obvious way to cut vehicle weight.

Canadian firms have enjoyed success in producing aluminum and magnesium parts – for example, Burlington Technologies, which specialises in aluminum diecastings and Meridian Technologies, which specialises in magnesium diecastings. Yet despite Canada's competitive advantages as a producer of raw aluminum and magnesium, much of the opportunity created by shifts to lighter materials is being exploited elsewhere – witness the considerable success of Mexican firms in securing contracts for aluminum castings. This is because shipping costs for raw materials often represent a trivial fraction of the cost of production. What is not trivial, however, is the energy cost involved in melting metal. One potential way for Canada to retain and attract business, therefore, is to develop technologies that cut out intermediate steps between raw metal production and final formation of automotive parts. Such technologies could make it more economical to make parts near the source of the raw materials, rather than to ship semi-processed materials great distances to take advantage of lower labour costs.

Lightweight materials technology is thus one example of the kind of technology that might merit research and development support, but there are potentially many others. What is important for the long run, however, is a focus on supporting those technologies that can give Canadian producers a persistent cost or quality advantage.

A final potential role for government policy is suggested by the potential emergence of Mexico as a free trade hub by virtue of its trade agreements with the EU and numerous other countries outside the NAFTA trade area. While these agreements may expose some Mexican producers to short-run risks from firms with excess capacity outside Mexico, Mexico is willing to face that challenge, confident that its manufacturing sectors will benefit in the long run as a preferred place to invest to serve global markets. Already, this policy appears to helping to attract new investments from European firms already doing business in Mexico and may attract more business from other firms new to North America.

Could Canada Attract Some of This Investment with Free Trade Agreements of Its Own?

Clearly, Canada would not be the preferred location for investments in sectors dominated by low labour costs alone. But, potentially, free trade access to European, South American, and other markets could attract some investments that would otherwise go to Mexico or, especially, to the U.S. Given the current U.S. political climate, in which the U.S. Congress is reluctant to give the U.S. President the "fast track" authority needed to negotiate broad trade agreements, Canada may have an opportunity to leap-frog the U.S. in trade access, making it a still more attractive country into which to invest.

6. APPENDIX I: COST COMPARISONS BETWEEN CANADA AND MEXICO

Given the information illuminated in sections 2 and 3, this section of the report compares the cost of setting up automotive facilities and running them in Canada and Mexico. While the numbers used come from published sources,[118] this exercise should be taken as a case study that illustrates some trends and is revealing of the major differences between the two countries, rather than as the exact evaluation of an actual investment case.

6.1 ASSUMPTIONS

To make a proper comparison we estimate the initial investment costs and the annual location sensitive costs of setting up a company in Mexico and Canada.

We assume the case of a 100,000 square feet plant on an 8-acre property that is purchased. This plant has 300 employees:

- 2 plant managers;
- 3 production managers;
- 5 production engineers;
- 15 production technicians;
- 5 accountants;
- 5 secretaries;
- 225 skilled workers; and,
- 40 unskilled workers.

To reflect the diversity in Mexico, we consider nine possible plant locations in areas where the automotive industry is present and where there is available land to be purchased: Saltillo, Coahuila; Ramos Arizpe, Coahuila; Monterrey, Nuevo Leon; Aguascalientes, Aguascalientes; Toluca, Mexico; Leon, Guanajuato; Queretaro, Queretaro; Puebla, Puebla; and, Guadalajara, Jalisco. This list includes locations in the North (i.e. Monterrey or Saltillo) as well as in the centre of the country (i.e. Toluca or Puebla) and smaller urban areas (i.e. Ramos Arizpe) as well as large cities (i.e. Guadalajara).

In turn, we disaggregate variable cost into its main components to reflect differences across locations. Variable cost is broken into the following categories: labour costs; electricity costs; interest; depreciation; non-income taxes; and, income taxes. Other costs are assumed to be the same in both Canada and Mexico, and hence they are excluded from the calculations.

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[118] The Mexican data are from Bancomext *Industrial Costs in Mexico: A Guide for Foreign Investors* except where otherwise indicated. The Canadian data were obtained from Industry Canada and we understand that they are derived from a study undertaken by KPMG except where otherwise indicated.

6.2 INITIAL INVESTMENT COSTS

As can be seen in Table 6.1 below, taking the mid-point of the minimum and maximum estimated costs and comparing this to the average for Canada,[119] initial investment costs are 13% lower in Mexico than in Canada.[120] On the other hand, both the costs of acquiring land and of building vary significantly across locations. Indeed, in large cities (for example Guadalajara) initial investment costs may be significantly higher (e.g. 45.5% higher) than in Canada. In contrast, in newly developing areas (for example Aguascalientes) the initial investment costs may be only one-third of what they are in Canada.

These results reflect the comments of some respondents in the sense that initial investment costs are not very different from what they are in Canada, but that they vary significantly depending on the specific location. We have not considered additional investments in infrastructure that may be required in the case of large plants that function as anchors of industrial developments and that were mentioned in some of our interviews.[121]

6.3 LOCATION SENSITIVE COSTS

For each of the location sensitive costs we use published data consistent with those included in Section 2. Labour costs are taken from *Industrial Costs in Mexico 2000*, published by the Banco de Comercio Exterior, S.N.C., and adjusted by a factor of 2.5 to include benefits. As mentioned earlier, the issue of benefits is strategically important because turnover rates reflect retention policies put into effect by different companies. For purposes of facilitating cross-national comparisons, we have assumed a very generous benefit policy consistent with employers following a low turnover strategy. The resulting all-inclusive annual incomes are similar to those published in the *National Income Accounts* by the Instituto Nacional de Estadística Geografía e Informática. In the case of Canada, we take the average annual income of the 300 employees to be $42,721.

We assume the plant uses 400,000 kWh a month of electricity and that it costs $0.073 in Canada. The Mexican tariff is composed of two parts: a payment per kWh of billable demand and a payment per kWh of energy.

Real interest rates are taken to be 4% in Canada and 6% in Mexico, and we assume that 80% of the total investment is financed locally. The buildings are assumed to be fully depreciated in 20 years in both countries. Non-income taxes are taken to be 10% higher in Mexico than in Canada. Costs considered here represent approximately 85% of location sensitive costs; the remaining costs are assumed to be the same in both countries and are thus excluded from the calculations.

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[119] It should be noted that the mid-point need not be the same as the average. Unfortunately, this is the best comparison available given limited public data.

[120] Costs for land and building construction are taken from "Industrial Costs in Mexico 2000", published by the Banco de Comercio Exterior, S.N.C.

[121] Overpasses, water wells, roads, etc.

As can be seen in Table 6.2, taking the mid-point of the minimum and maximum estimated costs for Mexico and comparing this to the average for Canada, location sensitive costs of this prototypical plant are 47% lower in Mexico than in Canada. As in the case of initial investment costs, however, this average number can hide significant differences across locations. Variations in location sensitive costs are almost exclusively explained by differences in wage rates as the other cost components offset each other.

In the large labour markets (e.g. Guadalajara, Puebla and Toluca, which are close to Mexico City), wages for unskilled workers are low because there is a large pool of entrants in the labour force. In smaller areas (e.g. León, Saltillo and Queretaro) labour markets are quite tight with relatively high wages thereby reducing the competitive advantage of that location. (This factor was noted in our interviews, with one respondent noting that he would not today choose to locate a plant in Coahuila, since the available, high-quality labour pool near Saltillo and Ramos Arizpe had already been exhausted. Plants in the area must increasingly rely on workers arriving from other parts of Mexico, whose labour could be far more cheaply obtained nearer their original homes.) Since transportation costs are not contemplated, however, the proximity to the assembly plant may more than compensate for this relative disadvantage.

6.4 CONCLUSION

Rather than being an exact evaluation of an actual investment project, this exercise reveals major differences in the cost structures of Canada and Mexico. While initial investment costs are smaller in Mexico compared to Canada the margins hardly seem large enough to be a determining factor of investment decisions. On the other hand, our calculations of location sensitive costs indicate that Mexico has a clear advantage in the case of labour intensive processes. Consistent with the views of respondents, labour costs are more likely to constitute the major determinant of new investment locations, particularly for automotive parts manufacturers that need to be close to the OEMs.

Finally, there seems to be a trade-off when deciding where to locate a new plant. In large urban areas, initial investment costs are higher but the labour pool is deeper so skilled workers are easier to find and wages are lower. On the other hand, smaller towns entail smaller initial costs but it may be harder and more expensive to find skilled workers.

Table 6.1: Initial Investment Costs

City	Land			Buildings			Total			Percent of Canada		
	MID POINT	MIN	MAX	MID POINT	MIN	MAX	MID POINT	MIN	MAX	MID POINT	MIN	MAX
Saltillo	$1,173	$978	$1,368	$2,696	$1,791	$3,600	$3,868	$2,769	$4,968	66.0%	47.3%	84.8%
Ramos Arizpe	$1,230	$983	$1,477	$3,664	$3,134	$4,194	$4,894	$4,117	$5,671	83.5%	70.3%	96.8%
Monterrey	$1,584	$723	$2,445	$4,412	$3,512	$5,312	$5,996	$4,235	$7,757	102.3%	72.3%	132.4%
Hermosillo	$2,809	$1,872	$3,745	$4,949	$3,927	$5,970	$7,757	$5,799	$9,715	132.4%	99.0%	165.8%
Aguascalientes	$1,303	$869	$1,737	$1,738	$1,106	$2,370	$3,041	$1,975	$4,107	51.9%	33.7%	70.1%
Toluca	$1,841	$1,394	$2,289	$3,719	$2,860	$4,578	$5,561	$4,254	$6,867	94.9%	72.6%	117.2%
Leon	$1,345	$962	$1,727	$1,940	$1,194	$2,687	$3,285	$2,156	$4,413	56.1%	36.8%	75.3%
Cuernavaca	$4,213	$2,341	$6,085	$4,425	$3,793	$5,057	$8,638	$6,133	$11,142	147.4%	104.7%	190.2%
Queretaro	$996	$843	$1,149	$3,888	$2,827	$4,949	$4,884	$3,669	$6,099	83.4%	62.6%	104.1%
Puebla	$1,121	$505	$1,737	$4,701	$3,433	$5,970	$5,822	$3,937	$7,707	99.4%	67.2%	131.6%
Guadalajara	$3,747	$3,568	$3,927	$4,776	$3,881	$5,672	$8,524	$7,449	$9,599	145.5%	127.1%	163.8%
San Luis Potosi	$754	$728	$780	$2,180	$1,343	$3,016	$2,934	$2,071	$3,797	50.1%	35.4%	64.8%
Mid-Point in Mexico	**$1,843**	**$1,314**	**$2,372**	**$3,591**	**$2,733**	**$4,448**	**$5,434**	**$4,047**	**$6,820**	**92.8%**	**69.1%**	**116.4%**
Canada	**$1,597**			**$4,261**			**$5,858**					

Table 6.2: Location Sensitive Costs

	Labour and Benefits								Total			Percent of Canada		
	Mid Point	Min	Max	Elec-tricity	Inter-est	Depri-ciation	Non-income taxes	Other	Mid Point	Min	Max	Mid Point	Min	Max
Saltillo	$5,508	$3,855	$7,161	$495	$129	$135	$525	$1,969	$8,761	$7,108	$10,414	55.0%	44.6%	65.3%
Ramos Arizpe	$4,749	$3,706	$5,793	$495	$176	$183	$525	$1,969	$8,097	$7,053	$9,141	50.8%	44.3%	57.3%
Mon-terrey	$6,239	$4,472	$8,005	$361	$212	$221	$525	$1,969	$9,526	$7,759	$11,292	59.8%	48.7%	70.8%
Hermo-sillo	$4,980	$3,687	$6,274	$441	$238	$247	$525	$1,969	$8,401	$7,107	$9,694	52.7%	44.6%	60.8%
Aguasca-lientes	$3,727	$3,687	$6,274	$388	$83	$87	$525	$1,969	$6,779	$6,739	$9,326	42.5%	42.3%	58.5%
Toluca	$7,173	$2,740	$4,713	$388	$179	$186	$525	$1,969	$10,419	$5,987	$7,959	65.4%	37.6%	49.9%
Leon	$6,026	$5,836	$8,509	$388	$93	$97	$525	$1,969	$9,098	$8,908	$11,582	57.1%	55.9%	72.7%
Cuerna-vaca	$4,608	$5,283	$6,768	$388	$212	$221	$525	$1,969	$7,924	$8,599	$10,084	49.7%	54.0%	63.3%
Quere-taro	$3,990	$5,283	$6,768	$388	$187	$194	$525	$1,969	$7,253	$8,546	$10,031	45.5%	53.6%	62.9%
Puebla	$5,373	$3,320	$5,896	$388	$226	$235	$525	$1,969	$8,716	$6,662	$9,239	54.7%	41.8%	58.0%
Guada-lajara	$4,942	$3,499	$4,481	$388	$229	$239	$525	$1,969	$8,292	$6,849	$7,831	52.0%	43.0%	49.1%
San Luis Potosi	$4,343	$4,217	$6,529	$388	$105	$109	$525	$1,969	$7,438	$7,312	$9,625	46.7%	45.9%	60.4%
Mid Point in Mexico	**$5,138**	**$4,132**	**$6,431**	**$408**	**$172**	**$180**	**$525**	**$1,969**	**$8,392**	**$7,393**	**$9,690**	**52.7%**	**46.4%**	**60.8%**
Canada	**$12,792**			**$351**	**$136**	**$213**	**$478**	**$1,969**	**$15,939**					

7. APPENDIX II: LABOUR AND EMPLOYMENT POLICY IN MEXICO AND CANADA

7.1 MEXICO

Details on social security, employee housing, profit sharing, bonuses, retirement insurance, public pensions, safety, benefits, holidays, vacation, work schedule, wages, dismissal and severance, unions, strikes and labour provisions under NAFTA are provided below.

(i) Social Security

All workers are automatically covered by the public health care system, called the Mexican Social Security Institute (*Instituto Mexicano del Seguro Social, IMSS*). It is the employer's responsibility to register the employee as well as to contribute an average of 17.42% of each worker's salary into the social security fund. Benefits include basic health care and medications, attention to occupational accidents and care for illnesses.

In addition, many companies offer private health insurance plans as well. Legal reforms to the Social Security Law (*Ley del Seguro Social*) that would reduce mandatory contributions to IMSS in favour of private health care plans are pending.

(ii) Employee Housing

Employers also are required to pay a 5% fixed payroll tax to finance the National Fund for Worker Housing (*Instituto Nacional del Fondo de la Vivienda para los Trabajadores, INFONAVIT*). The goal of this federal program is to provide low interest home mortgages for workers.

(iii) Profit Sharing

Federal law requires firms to participate in a profit sharing program in which 10% of the firm's annual fiscal profits are set aside for distribution among employees based on a formula considering the number of days worked. Executive officers and general managers do not participate in this program and there are conditions under which a company may be exempt.

(iv) Christmas Bonus (Aguinaldo)

Firms are required to pay a year-end Christmas bonus to all employees equivalent to at least two-weeks pay. However, at most companies, the Christmas bonus exceeds this amount. The average is 30 days although at times it is as much as 70 days. Those who have worked less than one year receive a pro-rated amount.

(v) Retirement Insurance

Since the implementation of the Retirement Savings System (*Sistemas de Ahorro para el Retiro, SAR*) in 1993, employers must pay 2% of a worker's salary (up to 25 times the minimum wage) to a government-run retirement fund in a bank account under the worker's name. However, Mexico's social security system was overhauled in 1997 when the new social security law allowed for the participation of private pension fund managers know as Afores.

(vi) Public Pensions

Mexico's previous retirement program, managed through IMSS was facing problems similar to those of many countries where retirees are soon expected to out-number contributors. In fact, the annual growth rate for retirees over the next 20 years is projected at 5.7%, compared to a rate of only 2.6% for contributors.

Under Mexico's privatised social security system, the individual pays a certain amount towards retirement, which is deposited in a privately owned individual account, instead of being used to pay current beneficiaries. The individual's funds are then invested in private capital markets. The benefits received are based on what has been paid in and the returns that the investment have earned.

Initially, the government will be the sole borrower and there will be no high-risk investments. In subsequent years, the funds will be a source of financing for projects such as housing, regional development and infrastructure. It is also expected that Mexico will eventually invest world-wide, as there is not enough domestic growth to provide constant investment opportunities.

The government hopes that this injection of pension savings into financial markets will increase the internal savings rate to nearly 25% of Mexican GDP in next three to five years.

(vii) Safety

Employers are responsible for ensuring compliance with occupational hazard regulations. Workers who suffer any form of occupational accident are entitled to whatever medical attention is deemed necessary, regardless of whether the worker's or co-worker's negligence contributed to the accident. Medical care is administered by the IMSS. Employers are obligated to modify facilities for the safety and health of the workers.

(viii) Executive Benefits

In addition to the benefits required by law, most companies offer their executives benefit packages. Many companies offer to pay moving expenses and/ or subsidise housing costs and the use of an automobile is not uncommon. Other benefits may include a larger Christmas bonus, additional vacation premiums, restaurant/grocery store coupons, business and social club dues, bonus plans, low interest insurance policies and private school tuition.

(ix) Legal Holidays

Mexican Federal Labour Law establishes seven legal paid holidays per year. Besides these legal holidays many businesses and labour contracts observe approximately five additional days for religious and national celebrations.

(x) Vacation

Vacation time is guaranteed and rewarded based on seniority. Six days of paid vacation must be offered after one year of service plus two additional days each year for the next three years. By the fifth year of service, this adds up to two weeks of paid vacation. After five years of employment, two more days must be added for each five-year block of service.

(xi) Work Schedule

The blue collar work force typically works a six-day, 48-hour work week, the maximum allowed by iaw. The white collar work force usually works an average of 40 hours a week.

Neither pregnant women nor minors are allowed to work in areas of potential health risks, after 10 p.m., nor are they allowed to work overtime. The minimum legal working age is 16 years with the permission of parents and a permit from the Secretary of Labour and Social Welfare *(Secretaría del Trabajo y Previsión Social, STPS)*. Overtime is paid at twice the hourly wage for the first nine hours after 48 hours, or for working on a legal holiday or a weekend. Triple the normal wage rate is paid after the first nine hours of overtime.

(xii) Wages

According to the Federal Labour Law, the daily minimum wage should represent a purchasing power that allows for a basic standard of living. It is set annually by the federal government and differs by geographic region.

(xiii) Dismissals and Severance

If a work relationship is not specifically defined as temporary from the start, there are few circumstances under which an employee can be legally dismissed without incurring severance payments.

Terminating a work relationship without a "just cause" requires a severance or indemnification payment. Employers must pay three months salary plus 20 days pay per year of service. Employees with 15 or more years seniority who leave voluntarily are entitled to a minimum compensation of 12 days pay per year of service since May 1970, when this law went into effect.

Firing employees without providing financial compensation is possible only when an employee grossly violates one of the "just causes" that are stated and regulated by the law. Such circumstances might include, for example: sabotage, flagrantly neglecting safety procedures or working under the influence of controlled substances. Written notification within 30 days of the violation stating reasons and effective date of termination is also required for dismissal without financial compensation. Other reasons for which an employer can avoid severance payments include failure to complete a labour contract or a physical or mental disability that prevents a worker from fulfilling his duties.

Dismissed employees with two or more years of service have the right to sue for reinstatement. If the employee is reinstated, full back pay will be received and, in some cases, punitive damages granted to the reinstated employee from the employer.

(xiv) Unions

The traditional goal of Mexican unions has been to protect the interests of the employee, with emphasis on workers with greater seniority. Approximately 30% of the Mexican work force is unionised. This level increases to 80% in industries where companies average 25 or more employees. Most unionised workers belong to one of the nine largest labour groups. Unions may be formed freely by registering with federal or state authorities, but this tends to be a long process filled with delays.

Collective agreements are difficult to change once established. This is similarly the case for benefits provided outside of the collective agreement. For example, under the philosophy of acquired rights, if a certain bonus is given one year, the union will expect that bonus the following year.

(xv) Strikes

Although the Mexican constitution establishes the right of registered unions to strike, very few strikes actually occur. Strikes must be filed with the Federal Labour Conciliation and Arbitration Board *(Junta Federal de Conciliación y Arbitraje, JFCA)* to be deemed legal. If the JFCA does not grant permission to strike, employees have 24 hours to return to work or face termination. If the strike is ruled legal then management can neither enter the premises nor hire replacements. All operations must halt until the strike is resolved.

(xvi) Labour Under NAFTA

NAFTA includes provisions for labour. The NAFTA agreement requires each government to enforce its own labour laws and includes a mechanism for individuals and/or groups to file a complaint whenever they feel that lack of enforcement is creating unfair competition.

The North American Commission on Labour Cooperation (NACLC*)* is responsible for overseeing labour-related disputes. Once a complaint has been filed, it is first directed to one of the three national administration offices for consultation. Each NAFTA country has an administration office in its capital city. If necessary, the complaint is then passed to the NACLC's ministerial council. This council is comprised of the three countries' trade ministers. If no agreement is reached at this level, an independent evaluation is conducted. The independent commission created for this purpose researches the issue in all three countries and then looks for evidence showing consistent or systematic failure to enforce a certain component of labour law.

7.2 CANADA

Standard Canadian employer-paid statutory benefits and taxes based on wages are as follows:

- Unemployment Insurance Premiums: Employees pay unemployment insurance premiums of 2.25% of gross income up to the maximum amount of $39,000. Employer's contribution is 1.4 times that of the employee.[122]
- Employer provincial medical health tax: In Ontario, the employer provincial medical health tax varies from 0.98% to 1.95%, depending on the amount of the employer's annual payroll.[123] From 1999, privately held companies are exempt from the employer health tax on the first $400,000 of annual payroll. The health tax on gross payroll over $400,000 is 1.95%. Public companies and associated companies are not exempt from the health tax on the first $400,000 of their gross payroll.[124] Self-employed individuals are required to remit the employer health tax when net self-employment income is in excess of $300,000.
- Canada Pension Plan: Both employers and employees contribute 4.3% of an employee's gross income to the Canada Pension Plan to a maximum of $38,300. There is a basic exemption of $3,500.
- Workplace Safety and Insurance Board (WSIB): This insurance is mandatory only for some industries. Employers in a number of industries including manufacturing, retail, wholesale and construction are obliged to insure their employees against injury. The annual maximum insurable earnings are $60,600. The rates vary by industry but have generally been declining (between 1995 and 2001, the premiums for all registered employers were reduced by 29% on average). The premiums in the auto sector are as follows:[125]
- Motor vehicle assembly industry: $2.42 for every $100 of gross wages
- Motor vehicle engines and parts industry: $1.33 per $100 of gross wages
- Other motor vehicle parts and equipment industries: $2.34 per $100 of gross wages
- Motor vehicle stampings industry: $2.34 per $100 of gross wages
- Motor vehicle wheels and brakes: $2.25 per $100 of gross wages
- Motor vehicles fabric accessories industry: $3.37 per $100 of gross wages

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[122] Canada Customs and Revenue Agency General Inquiries

[123] OHIP office (905)-273-9490, (905) 275-2730. Changes to Ontario's Employer Health Tax at http://www.manulife.com/gb/groupben…les/htmllc-p-o.3/$File/lc-p-o.3.htm

[124] Public and associated companies' Ontario health tax rates on the first $400,000 of payroll are as follows: $200,000 or less, 0.98%; $200,000-$230,000, 1.101%; $230,000-$260,000, 1.223%; $260,000-$290,000, 1.344%; $290,000-$320,000, 1.465%; $320,000-$350,000, 1.586%; $350,000-$380,000, 1.708%; finally, on $380,000-$400,000 the tax payable to the government of Ontario is 1.829%.

[125] WSIB office in Toronto (416) 344-1013 and Workplace Safety & Insurance Board web site: http://www.wsib.on.ca/

- Trucks, buses and trailers industry: $3.75 per $100 of gross wages

In addition, by legislation, employers are required to provide employees with two weeks vacation upon completion of a full-year of employment.

In comparing these employee benefit costs in Canada and the U.S., KPMG in 1995 found that statutory plans represent 9.2% of gross annual payroll in the U.S. compared with 11.2% in Canada. This difference is mainly due to the total amount of dollars paid by employers for unemployment insurance premiums. Although, the percentage of gross pay for these premiums is lower in Canada than in the U.S., the base maximums for individual employers is lower in the U.S.[126]

Automotive industry labour costs in Canada are generally lower than in the U.S. This is in part because employer-sponsored benefits are relatively cheaper in Canada. Costs for hospital, surgical, medical and major medical insurance premiums are the prime reason for the difference in costs. In a 1995 study, KPMG found insurance premiums to represent 8.2% of gross pay in the U.S. compared with 1.0% in Canada.[127] Canada's publicly funded health care system decreases the amount of health care insurance costs that are generally incurred by employees, particularly in unionised industries.

With respect to government programs that affect employment in the automotive sector, the Ontario budget designated $2 million to expand the Women in Skilled Trades program for pre-apprenticeship training in order to encourage employment of women in the auto parts sector.

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[126] KMPG, March 1995, at 23.

[127] "A Comparison of Business Costs in Canada and the United States", prepared for USA Trade and Investment Division, Canadian Department of Foreign Affairs and International Trade, KPMG, Vacouver, March 1995, at 22.

8. APPENDIX III: TAX REGIMES IN MEXICO AND CANADA

8.1 MEXICO

Mexican Resident Companies

A Mexican resident company is liable for corporate income tax on its worldwide income. Resident company is defined as those with their principal administration of their business in Mexico. The principal administration of a business is located where the directors or administrators exercise management and control. The law presumes that, unless proven otherwise, companies incorporated under Mexican law are residents of Mexico.

Corporate Income Tax

The corporate income tax rate for both resident and non-resident companies in Mexico is 34% of taxable income. Withholding tax on income transferred out of Mexico is also at the general corporate income tax rate of 35%, but is subject to specific rules if there are Double Tributation Treaties between Mexico and other countries. If the income is reinvested in Mexico, the withholding tax is 10%. The tax rules in Mexico for joint ventures involving a foreign firm are the same as those for joint ventures involving national firms.

When determining the tax base of companies or individuals that carry on business activities, computations of gains and losses on monetary assets and liabilities must be adjusted for inflation. Annual depreciation and amortisation charges for tangible and intangible fixed assets are adjusted by applying inflation indices, and any gain or loss on the sale of such assets is similarly adjusted. The cost of goods sold is immediately deductible, and no account is taken of opening and closing inventories. Losses brought forward and capital subscriptions to a company by its shareholders may be adjusted. Tax rates and limits on revenues, deductions, and tax credits expressed in pesos are automatically adjusted semi-annually in the months of January and June by means of a restatement factor that covers the period from seven months earlier up to the month prior to that for which restatement is made. The restatement factor is based on the National Consumer Price Index published by the central bank.

Capital Gains

Capital gains resulting from the sale of an enterprise's fixed assets are normally included in gross receipts and are subject to corporate income tax at the normal rate. In calculating gains, companies may adjust the deductible cost of the assets to take account of the effects of inflation. Accordingly, when a fixed asset is sold or disposed of, the taxable income or deductible loss arising is computed by subtracting the inflation adjusted cost from the disposal proceeds.

Contributions to R&D and Employee Training

Contributions to technology research and development funds are deductible if they are placed in an irrevocable trust with an authorised institution, if they do not exceed 1.5% of the contributor's revenues for the year, and if they are allocated solely to technology research and development programs and only expended on fixed assets related directly and exclusively to such programs.

Contributions to funds for creating employee training programs are deductible up to 1% of revenues obtained in the year, provided that specific requirements are met.

Tax Treatment of Losses

Tax losses may not be carried back, but they may be carried forward for five years. If at the end of the five-year period tax losses have not been fully amortised, relief may be claimed in the subsequent five years, as long as an accounting loss arises in the year of claim. However, the amount deducted is restricted to the accounting loss in the year of claim.

Tax losses may be adjusted to take account of inflation. In the tax year in which the loss is incurred, the loss is increased by the percentage increase in the National Consumer Price Index from the first month of the second half of that year to the last month of that year. In subsequent tax years, the loss (as already adjusted) is increased by the percentage increase in the National Consumer Price Index from the last month of the year in which the loss was last adjusted up to the last month of the year preceding that in which the loss is to be deducted. Losses must only be used by the company incurring them.

Taxation of Non-resident Entities

A non-resident company with a permanent establishment in Mexico is liable for Mexican corporate income tax at 34% on the income (after deducting allowable expenses) attributable to that permanent establishment and for final withholding taxes on the gross amount of any other income that the company receives from Mexican sources. Attributable income is basically income that results from the business activity carried out by the Mexican permanent establishment; income from goods and personal and real property sold in Mexico by the home office or by any permanent establishments in other countries; and income obtained by the headquarters or any establishments abroad, in the proportion that the permanent establishment has participated in the expenses incurred to obtain the income.

Any place in which business activities are conducted, including a branch or office, is considered a permanent establishment. In addition, a foreign company is considered to have a permanent establishment in Mexico if it carries out activities in the country through any person that concludes contracts in the company's name, that has a stock of goods or merchandise out of which deliveries are made on the company's behalf, that assumes risks on account of the foreign company, that acts according to the specific instructions of the foreign company, that carries out activities that should be performed by the foreign company and that would not normally be performed by the person acting independently, or that is remunerated irrespective of the results of the activities carried out. However, a non-resident is not deemed to have a permanent establishment in Mexico if it can prove that operations were carried out on arm's-length terms through a person that does not exercise any authority.

A foreign associate in a joint venture that operates through a Mexican place of business is considered to have a permanent establishment. In the case of construction, installation, maintenance and similar services, or related inspection or supervision activities, a permanent establishment exists when the services extend for more than 183 days in a twelve-month period.

A non-resident company without a permanent establishment or fixed base in Mexico is liable for tax on Mexican source income only, usually collected through a withholding tax.

Branches of foreign companies and other Mexican permanent establishments or fixed bases of companies resident abroad may deduct expenses relating to their activities in Mexico, whether such expenses are incurred in Mexico or abroad, even when those deductions are prorated with the foreign head office or other foreign establishments of the non-resident company, provided that established requirements are met. In particular, payments by a Mexican permanent establishment to its foreign main office or other foreign establishments of the non-resident company are not deductible, even in the case of royalties, fees, commissions, or interest. The only exceptions to this rule are payments for the purchase of merchandise or fixed assets.

Profits and capital repayments remitted in cash or in kind from the Mexican permanent establishment or fixed base of a foreign company to its head office or to a foreign permanent establishment are considered dividend income when they are not paid from the balance of the net tax profit account or the capital remittance account kept by the paying entity. The permanent establishment or the fixed base must, in these circumstances, pay tax at 34% on the result of multiplying the amount of the profits or remittances that exceeds the balance by a factor of 1.515. Thus, no tax is payable if profits or remittances do not exceed the balance in the accounts.

The balance on the capital remittance and net tax profit accounts is adjusted for inflation at the end of each year (without including the net tax profits in that year).

Branches and Subsidiaries

While a Mexican resident company is liable for corporate income tax on its world-wide income, a non-resident company with a branch that constitutes a permanent establishment in Mexico is liable for corporate income tax only on income attributable to that branch. The rate is the same (34%); however, tax and other incentives may be more difficult to obtain for branches than for corporations. Consequently, investors should also be aware that there are tax implications when a branch is reorganised as a subsidiary.

Taxation of Individuals

An individual resident in Mexico is liable for personal income tax on his or her world-wide income. Non-resident individuals are taxed on all their Mexican-source income, generally by way of withholding taxes. These withholding taxes are contained in Table 1 as are the tax rates on surplus income.

Table 1: Mexican Personal Income Tax Rates

Personal Income Tax
Annual Rates for Year 2000
U.S. Dollars

Lower Limit	Upper Limit	Fixed Payment	% Applicable on the surplus of lower limit
0.01	511.73	0.00	3.0%
511.74	4,343.40	15.35	10.0%
4,343.40	7,633.14	398.51	17.0%
7,633.14	8,873.21	957.78	25.0%
8,873.21	10,623.63	1,267.80	32.0%
10,623.63	21,426.36	1,827.92	33.0%
21,426.36	62,464.12	5,392.83	34.0%
62,464.12	187,392.33	19,345.65	35.0%
187,392.33	249,856.47	63,070.54	37.5%
249,856.47	Farther on	86,494.59	40.0%

Source:Income Tax Law

Personal business tax earnings are taxed at a fixed rate of 34%, and some special rates apply to income from prizes. In other cases, progressive rates apply. The table of progressive rates for the year is in effect compiled by adding together the twelve monthly wage withholding tax tables in force during the year (these tables are adjusted semi-annually to take into account the effects of inflation.)

Other Taxes

(i) Tax on Assets

The tax on assets is charged at 1.8% of the average value of the taxpayer's assets over the year. This federal tax on assets (*Impuesto al Activo*) or net worth does not constitute the type of minimum income tax that exists in other countries, but its objectives are similar. Income tax may be credited against the tax on assets. Thus, if income tax due is equal to or greater than tax on assets, no additional tax is levied.

Those that must pay the tax include resident companies and individuals engaged in business activities and permanent establishments of non-residents (on assets attributable to those establishments).

(ii) Value Added Tax

Value Added Tax (VAT) is levied on individuals and companies (including non-residents with establishments in Mexico) that sell goods, provide services, grant temporary use or enjoyment of goods, or import goods and services. VAT is computed by crediting taxes paid on purchases against tax liabilities arising from sales. It is charged on the total selling price of the goods, rights, or services and on the value of imported goods or services. The total selling price includes additional charges for expenses. Taxes paid to acquire and use goods and services may not be credited when the related expenses are not deductible for income tax purposes, and if the expenses are only partially deductible, the tax may be credited only in the proportion in which the expenses are deductible.

The general VAT rate of 15% applies to most activities, including those in border and free trade zones. Special rates may apply for specified activities. Some activities, such as the sale and import of foods and patent medicines, are zero-rated. Exports are also zero-rated. Some imports are exempt, including returns of goods temporarily exported, goods in transit or subject to reshipment, and goods and services that would be exempt or subject to the zero rate if supplied within Mexico. When goods and services are exempt from VAT, the seller or supplier must not charge VAT and cannot recover any VAT incurred.

(iii) Real Estate Acquisition and Property Tax

There is a real estate acquisition tax that is levied at 2% on individuals and companies that acquire real estate in Mexico. The tax base is the value of the real estate. This tax is also applied to mergers and divisions, even though no sale of real estate takes place.

Real estate property tax is a state tax levied on owners of real estate. The tax base is the officially registered value of the property as determined by the taxpayer per appraisal value or by unit values of the property provided by local tax authorities. The rates are determined by each state; as a rule, the tax charged is not burdensome.

(iv) Vehicle Possession and Use Tax

Vehicle possession and use tax is paid by individuals and companies that own automobiles, buses, trucks, tractors not used for farming, airplanes, ships, sailboats, motorised water skis, motorised surfboards, and motorcycles. Some exemptions exist. The rate of tax is determined yearly and varies with make and model.

(v) Miscellaneous Taxes

New car tax is paid in addition to VAT by vendors of new automobiles in Mexico and individuals or corporations that import new automobiles into Mexico. Individuals and companies must pay the fees assigned annually by Congress for a variety of public services provided by the government. Fees must also be paid for the use and enjoyment of government property and the exploitation of mineral and metal deposits.

8.2 CANADA

Canadian corporate and personal taxes are generally falling rendering them increasingly internationally competitive as both federal and provincial governments have balanced their budgets.

Corporate Taxes

The federal government's mini-budget in the fall of 2000 introduced even lower corporate tax rates than that previously announced in the spring 2000 budget. The mainstream federal corporate tax, on the highest taxed business sectors, such as services and high technology, fell from 28% to 27% on January 1, 2001, and is scheduled to fall to 25% in 2002, 23% in 2003 and finally to the target 21% in 2004 and thereafter.[128] The corporate tax rate in the manufacturing, processing sector and resource sectors already is a low 21% as a result of special tax preferences.

In addition to federal corporate taxes, the provinces also levy tax on corporate income. The combined federal and provincial corporate tax rates for income from general manufacturing and non-manufacturing active businesses in 2001 are contained in Table 2. The combined tax rate on income earned from general manufacturing is generally lower than that on general non-manufacturing income by 6.0 (British Columbia) to 18.5 (Yukon Territory) percentage points.

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[128] "2000 'Mini-budget' Highlights", *Canada Tax News Flash,* no. 2000-01, KPMG, October 18, 2000, at 3.

8. Appendix III: Tax Regimes In Mexico and Canada

Table 2: Combined Canadian Federal and Provincial Corporate Tax Rates for Active Business Income – 2001[129]

Province / Territory	General Non-Manufacturing Income	General Manufacturing Income
British Columbia	44.6%	38.6%
Alberta	43.6/41.6%	36.6/35.6%
Saskatchewan	45.1%	32.1%
Manitoba	45.1%	39.1%
Ontario	42.1%	34.1%
Quebec	37.2%	31.2%
New Brunswick	45.1%	39.1%
Nova Scotia	44.1%	38.1%
Prince Edward Island	44.1%	29.6%
Newfoundland	42.1%	27.1%
Yukon	43.1%	24.6%
NWT/Nunavut	42.1%	36.1%

In Ontario, the general and manufacturing corporate tax rates were reduced by one percentage point to 14.5% and 12.5% respectively, effective May 2, 2000.[130] They were further reduced to 14% and 12% respectively, effective January 1, 2001.[131] Further cuts are expected to be phased in so that by 2005 both the general and manufacturing corporate tax rates will have declined to 8%.[132] As a result of these tax reductions, by 2005, the combined federal/Ontario general and manufacturing tax rate is expected to be 29% or more than 10 percentage points lower than the average rate of the U.S. Great Lakes states.[133] The 1999 combined corporate tax rates in comparison were 44.6% for the general non-manufacturing sector and 35.6% for the manufacturing sector.

The Ontario small business corporate tax rate was also cut from 8% to 7%, effective May 2, 2000. Further tax reductions for this group are planned by January 1, 2005, by which point the small business tax rate is targeted to be 4%,[134] with the net result that by 2005, the combined corporate tax rate for small business will be 17.1%.[135]

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[129] "Keep Up With Falling Federal and Provincial Tax Rates for 2000 and 2001", *Canadian Tax Letter*, KPMG, November 2000, at 5.

[130] "*Tax Breaks*", June 2000, Deloitte & Touche, http://www.deloitte.ca/en/Pubs/tax/TaxBreaks/tb00-3.asp

[131] "2000 Ontario Budget", February 6, 2001, PriceWaterhouseCoopers, http://www.pwcglobal.com/ca/eng/ins-sol/spec-int/on_budget00.html

[132] "2000 Ontario Budget: Continuing Tax Cuts and New Personal Tax Framework", Feb.6, 2001, PriceWaterhouseCoopers. http://wwwpwcglobal.com/ca/eng/ins-sol/spec-int/on_budget00.html

[133] 2000 Ontario Budget Highlights: http://www.gov.on.ca

[134] "Tax Breaks" Deloitte & Touche, June 2000 http://www.deloitte.ca/en/Pubs/tax/TaxBreaks/tb00-3.asp

[135] *2000 Ontario Budget Highlights*: http://www.gov.on.ca

In addition to tax on corporate income, both the federal and provincial/territorial governments tax corporate investment income and capital gains (see Table 3). These rates are 7.7 percentage points higher for Canadian controlled private corporations (CCPC). The federal capital gains tax, which was also reduced in the November 2000 mini-budget from 66 2/3% to 50% for capital gains and losses realised after October 17, 2000, and is also lower (by 3.8 percentage points) for non-CCPC businesses.[136] For the 2001 taxation year in Ontario, 62% of capital gains will be subject to income tax. By 2004, Ontario's inclusion rate will have been decreased to 50%.[137]

Table 3: Combined Federal and Provincial Income Tax Rates for Corporate Investment Income and Capital Gains – 2001[138]

	Interests/Rents/Royalties		Capital Gains	
	CCPC	Non-CCPC	CCPC	Non-CCPC
Federal Rates	35.8%	28.1%	17.9%	14.1%
Federal and Provincial Combined Rates				
British Columbia	52.3%	44.6%	26.1%	22.3%
Alberta	51.3%/49.3%	43.6%/41.6%	25.6%/24.6%	21.8%/20.8%
Saskatchewan	52.8%	45.1%	26.4%	22.5%
Manitoba	52.8%	45.1%	26.4%	22.5%
Ontario	49.8%	42.1%	24.9%	21.0%
Quebec	52.3%	44.6%	26.1%	22.3%
New Brunswick	52.8%	45.1%	26.4%	22.5%
Nova Scotia	51.8%	44.1%	25.9%	22.0%
Prince Edward Island	51.8%	44.1%	25.9%	22.0%
Newfoundland	49.8%	42.1%	24.9%	21.0%
Yukon	50.8%	43.1%	25.4%	21.5%
NWT/Nunavut	49.8%	42.1%	24.9%	21.0%

In addition to these general taxes, there is also a 4% federal corporate surtax, which applies equally to manufacturers and other types of corporations.

A 1999 KPMG study found that Canada's effective combined corporate income tax rate (federal, regional, and local) in the manufacturing sector was generally lower than the corporate tax rate applicable to similar industries in the U.S., Europe and Japan.[139] This was largely due to federal and provincial tax rate reductions applicable to manufacturing operations in Canada. While corporate taxes have generally declined in Canada over the last year, the lower taxes on manufacturing income have remained at their already low rates or have decreased slightly (the combined federal/provincial rate in Alberta has declined from 36.6% in 2000 to 35.6% in certain instances; the combined rate in Ontario has declined from 35.6%/34.6% to 34.1%; the combined rate in Quebec has increased slightly from 31.0% to 31.2%).[140]

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[136] "Keep Up With Falling Federal and Provincial Tax Rates for 2000 and 2001", KPMG, November 2000, at 8.

[137] Tax Breaks June 2000, Deloitte & Touche http://www.deloitte.ca/en/Pubs/tax/TaxBreaks/tb00-3.asp

[138] "Keep Up With Falling Federal and Provincial Tax Rates for 2000 and 2001", KPMG, November 2000, at 7.

Personal Taxes

The November 2000 federal mini-budget also accelerated personal tax rate reductions from 29% to 26% on income in excess of $61,510 and introduced a new tax bracket for incomes equal to or greater than $100,000, for which a rate of 29% now applies.[141] In addition to the federal tax on personal income, there is provincial personal income tax and tax on capital gains and dividends earned by individuals. These combined personal taxes for the top marginal rate for 2000 are summarised in Table 4.

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[139] "The Competitive Alternatives: A comparison of business costs in North America, Europe and Japan", KPMG, March 1999, at 32.

[140] "Keep Up With Falling Federal and Provincial Tax Rates for 2000 and 2001", KPMG, November 2000, at 5.

[141] "2000 'Mini-budget' Highlights", KPMG, October 18, 2000, at 2.

Table 4: Combined Canadian Federal and Provincial Top Marginal Rates for Individuals – 2000

Province / Territory	Salary and Interest	Capital Gains	Dividends	Approximate Salary Income Level Where Top Rate Reached
British Columbia	51.3%	34.2%	34.6%	$82,600
Alberta	43.7%	29.1%	29.8%	$75,600
Saskatchewan	49.7%	33.1%	34.7%	$75,600
Manitoba	48.1%	32.0%	34.8%	$75,600
Ontario	47.9%	31.9%	32.3%	$75,600
Quebec	50.7%	33.8%	35.0%	$75,600
New Brunswick	48.8%	32.5%	32.9%	$101,500
Nova Scotia	48.8%	32.5%	32.9%	$80,900
Prince Edward Island	48.8%	32.5%	32.9%	$75,600
Newfoundland	51.3%	34.2%	34.6%	$75,600
Yukon	45.4%	30.2%	30.6%	$75,600
NWT/Nunavut	43.5%	29.0%	29.4%	$75,600

Property Taxes

Property tax is levied at the provincial and municipal level. Generally, the amount of tax paid is determined on the basis of an assessment of the value of the property and the buildings upon it. In Ontario, the government has recently reassessed property values. There is, however, a 5% limit on property tax increases for commercial, industrial and multi-residential properties for 2001 and 2002, based on the previous year's taxes.[142] Special Ontario property tax rules apply for new construction of commercial, industrial and multi-residential properties and additions/renovations where the value of the new construction is 50% or more of the original property value. In these cases, property taxes are calculated based on the lower of the property's current value assessment (CVA) taxes or the average level of taxation of similar properties in the vicinity.[143]

Federal Value-Added Tax and Provincial Sales Taxes

The federal government of Canada collects a value-added tax, referred to as the Good and Services Tax (GST), on most goods and services in the amount of 7%. All businesses with income over $30,000 per annum that conduct commercial activity must be registered for GST. The GST collected in the course of doing business is payable to the federal government. However, the GST that is paid by businesses on various purchases and expenses associated with business activity (inventories, utilities, leases, various other business expenses) is deducted from the GST payments for the final goods sold.

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[142] *The SALT Shaker: Sales and Local Taxes*, KPMG, January 2001, at 1.

[143] *The SALT Shaker: Sales and Local Taxes*, KPMG, January 2001, at 2.

In addition to the GST, most provinces levy a Provincial Sales Tax (PST) which is a retail sales tax payable by the final consumer. Three of Canada's Atlantic provinces (Newfoundland, New Brunswick and Nova Scotia) have harmonised their provincial sales tax into one Harmonised Sales Tax that is a combination of a provincial sales tax and the federal GST. It operates under the rules of the GST but the amount is 15% of the value of goods and services purchased.[144]

Specifically with respect to sales taxes that affect the automotive sector, the Government of Ontario 2000 budget provides for a phasing out of the Retail Sales Tax on motor vehicle insurance premiums by April 1, 2004.

Research and Development Support

The Canadian federal government has one of the most generous research and development (R&D) tax credit systems in the world.[145] Its basic structure was put in place between 1983 and 1985 and provides a variety of tax incentives mainly in the form of income tax deductions and investment tax credits for eligible current and capital expenditures.[146] Furthermore, for small Canadian-controlled private corporations, as found in the automotive parts sector, unused R&D tax credits are fully or partially refundable.[147]

More specifically, under the current system of federal income tax incentives for Scientific Research and Experimental Development (SR&ED),[148] the following current expenditures are eligible for the SR&ED tax incentives:

- Salaries/wages of employees directly engaged in SR&ED;
- The cost of materials consumed in SR&ED;
- Lease costs relating to machinery and equipment used all or substantially all (90% or more) for SR&ED;
- Eligible expenditures incurred by contractors performing SR&ED directly on behalf of the taxpayer;
- Eligible expenditures incurred by certain third parties where the taxpayer is entitled to exploit the results of the SR&ED; and,

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[144] GST/HST News, Edition #39, Canada Customs and Revenue Agency. http://www.ccra-adrc.gc.ca].

[145] *R&D Tax Incentives in OECD Countries: How Canada Compares*, Conference Board of Canada, 1997 (as referenced in "The Automotive Competitiveness Review 1998: Industry-Identified Issues", Industry Canada, June 1998, at 5).

[146] "The Federal System of Income Tax Incentives for Scientific Research and Experimental Development. Evaluation Report", Finance Canada, 1998.

[147] "The Automotive Competitiveness Review 1998: Industry-Identified Issues", Industry Canada, June 1998, at 14.

[148] The definition of Scientific Research and Experimental Development covers all basic research as well as applied research and experimental development.

- Overhead and administrative costs.

There are currently two rates of federal investment tax credit for SR&ED in Canada: a general rate of 20% and an enhanced rate of 35%, available to smaller Canadian-controlled private corporations (CCPCs).[149] From 1983 through 1994, a 30% tax credit rate was also available for SR&ED expenditures incurred in the Atlantic Provinces and the Gaspé region. A partial tax credit, equal to one-half of the normal credit, is also available for expenditures in respect of new equipment used primarily (more than 50%) for SR&ED. SR&ED tax credits may be deducted from federal taxes otherwise payable. Unused credits are refundable for smaller CCPCs at rates of 100% for up to $2 million of qualifying current expenditures, and 40% for other qualifying expenditures (the unclaimed balance of investment tax credits are partially refundable; this is referred to as the refundability rate[150]) (see Table 5). For other corporations, unused tax credits can be carried back three years or carried forward 10 years. Expenditures on equipment used primarily (more than 50% for SR&ED in Canada) may earn a partial tax credit.

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[149] The Federal System of Income Tax Incentives for Scientific Research and Experimental Development. Evaluation Report, Finance Canada. Chapter II: The Federal SR&ED Tax Incentives and Their Administration, at 4.

[150] "Income Tax Act: Scientific Research and Experimental Development Expenditures. Interpretation Bulletin", http:///www.ccra-adrc.gc.ca/E/pub/tp/it151r5em/it151r5-e.html. Refundable investment tax credit is defined in subsection 127.1(2) of Income Tax Act.

8. Appendix III: Tax Regimes In Mexico and Canada

Table 5: Canadian Federal SR&ED Tax Credit Rates and Rates of Refundability (%)

Business Type	Credit Rates	Refundability Rates	
		Current Expenditures	Capital Expenditures
Unincorporated Business	20%	40%	40%
CCPCs with prior-year taxable income, of - $200,000 or less:			
Expenditures up to expenditure limit	35%	100%	40%
Expenditures over expenditure limit	20%	40%	40%
- between $200,000 and $400,000:			
Expenditures up to expenditure limit	35%	100%	40%
Expenditures over expenditure limit	20%	0%	0%
CCPCs with prior-year taxable capital employed in Canada between $10 million and $15 million:			
Expenditures up to expenditure limit	35%	100%	40%
Expenditures over expenditure limit	20%	0%	0%
All Other Corporations	20%	0%	0%

The key difference between income tax deductions for R&D expenditures and non-R&D expenditures is that R&D expenditures are fully deductible rather than deductible over time through the capital cost allowance system. Another key difference is that SR&ED expenditures can be carried forward indefinitely; they are not just deductible in the year incurred. Eligible capital expenditures consist of expenditures for machinery and equipment that is all or substantially used or consumed in R&D in Canada.[151]

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[151] *Why and How Governments Support Research and Development, Annex: R&D Tax Support in the G-7 Countries and Australia*; Finance Canada http://www.fin.gc.ca/resdev/why3_e.html

Provincial Income Tax Incentives for R&D

In addition to the federal R&D tax incentives, all the provincial and territorial governments provide income tax deductions for research and development. The provinces of Manitoba, New Brunswick, Newfoundland, Nova Scotia, Ontario and Quebec also offer various types of other R&D tax incentives mainly in the form of tax credits.[152] These are summarised in Table 6.

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[152] *The Federal System of Income Tax Incentives for SRED - Evaluation Report*, Finance Canada http://www.fin.gc.ca

8. Appendix III: Tax Regimes In Mexico and Canada

Table 6: Summary of Canadian Provincial R&D Tax Incentives

Province and Tax Deduction	Tax Credit
Manitoba – provides 100% tax deduction on SR&ED current and capital expenditures. Additional Tax Deduction not applicable.	R&D Tax Credit (1992 budget): Rate: 15% - available to corporations on SR&ED expenditures incurred in Manitoba - non-refundable: seven-year carry-forward/three-year carry-back
New Brunswick - provides 100% tax deduction on SR&ED current and capital expenditures. Additional Tax Deduction not applicable.	R&D Tax Credit (1994 budget): Rate: 10% - available to corporations on SR&ED expenditures incurred in New Brunswick - non-refundable: seven-year carry-forward/three-year carry-back
Newfoundland - provides 100% tax deduction on SR&ED current and capital expenditures Additional Tax Deduction not applicable.	SR&ED Tax Credit (1995 budget, introduced in 1996): Rate: 15% - available to corporations on SR&ED expenditures incurred in Newfoundland SR&ED expenditures not reduced by government or non-government assistance - fully refundable
Nova Scotia - provides 100% tax deduction on SR&ED current and capital expenditures Additional Tax Deduction not applicable	R&D Tax Credit (1994 budget): Rate: 15% - available to corporations on SR&ED expenditures incurred in Nova Scotia - fully refundable
Ontario - provides 100% tax deduction on SR&ED current and capital expenditures R&D Super Allowance: Rates: non-CCPCs – 25% up to base amount and 37.5% on incremental SR&ED expenditures; CCPCs – 35% up to base amount and 52.5% on incremental SR&ED expenditures - mandatory deduction - base amount: average SR&ED expenditures of previous three years	Ontario Innovation Tax Credit (1994 budget): Rate: 10% - available for smaller CCPCs (i.e. those eligible for the enhanced rate of federal SR&ED tax credit) on SR&ED current expenditures and 40% of SR&ED capital expenditures - annual limit on SR&ED expenditures: $2 million - fully refundable; 100% of eligible expenditures; no carry-over of unused/unrefunded credits Ontario Business-Research Institute Tax Credit (1997 budget): Rate: 20% - available for corporations on SR&ED expenditures incurred in Ontario under approved contracts with eligible research institutes (e.g. universities, colleges, hospital research institutes and certain non-profit research organisations) - annual limit on SR&ED expenditures: $20 million

Province and Tax Deduction	Tax Credit
	- fully refundable: 100% of eligible expenditures
Quebec - provides 100% tax deduction on SR&ED current and capital expenditures; expenditures not reduced by federal or provincial tax credits (federal tax credits included in provincial income). Additional Tax Deduction not applicable.	R&D Tax Credit: Rates for corporations: 40% for small firms (assets under $25 million) on R&D salaries up to $2 million; 40% - 20% for medium firms (assets between $25 million and $50 million) on R&D salaries up to $2 million; 20% for large firms (assets over $50 million) and 20% for R&D salaries over 2 million Rates for contract R&D: 20% to 40% of eligible expenditures - fully refundable: 100% of eligible expenditures - two-year exemption for foreign researches
Other Provinces and Territories - provides 100% tax deduction on SR&ED current and capital expenditures. Additional Tax Deduction not applicable.	Not applicable.

Source: The Federal System of Incomes Tax Incentives for Scientific Research and Experimental Development – Evaluation Report, Finance Canada: http://www.fic.gc.ca

The net effect of the tax incentives for R&D is that in 1997 the after-tax cost of $1 of R&D expenditures in Ontario, Nova Scotia and Quebec was $0.507 or less, while, by comparison, the after-tax cost was $0.528 and higher for automotive assembly states in the U.S.[153]

In addition to these corporate incentives, the Ontario budget provides tax incentives for young R&D companies in the form of personal income tax exemptions for the first $100,000 each year in taxable employment benefits that research employees derive from stock options and capital gains from the sales of such options.[154]

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[153] Industry Canada, June 1998, at 14.

[154] 2000 Ontario Budget Highlights http://www.gov.on.ca/fin/bud00/research.htm

9. APPENDIX IV: TRANSPORTATION INFRASTRUCTURE IN MEXICO AND CANADA

New trade relations and a general growth in the volume of trade with other countries have increased the flow of merchandise coming in and out of Mexico. This demands increased efficiency and competitiveness of Mexican transportation systems. As a result, railway and highway privatisation in Mexico has been met with perhaps more enthusiasm than in other regions of the world. In ports, as well, investment over the past five years has been four times the amount invested for the previous forty years. Below, we discuss ports, highways, railways, and airports in both Mexico and Canada.

Ports

More than 80% of the total volume of Mexico's foreign trade, and more than 33% of the country's freight, moves through its ports. In comparison, 68% of the Canada's foreign trade representing 31% of Canada's freight moves through ports.[155] In addition to international movements, both countries also maintain inland waterways. In 1996, 12.0% of Canadian domestic freight activity occurred by water transport compared to 9.4% in Mexico.

Between 1993 and 1998, there was a 28% increase in the volume of products handled in the Mexican port system. In 1998 alone, freight movement increased by 8.1%. This brisk growth has been driven by heavy investments in new developments and the turnover of port administration to the financially self-sufficient Integral Port Administrations (API). Currently, 114 shipping lines from different nations handle foreign trade between Mexico and more than 370 ports around the world. Mexico's 108 ports are connected to the interior through an extensive railway and highway network. Similarly, in Canada, the 172 ports are well integrated with an extensive railway and highway network.

Highways

As a country of larger land mass, it is not surprising that Canada has a larger road system than Mexico. In 1996, Canada's road system consisted of 901,904 kilometers of roads of which 35.2% were paved and the remaining 64.8% were unpaved. Mexico's roads system was 312,301 kilometers long of which 31.7% were paved and 68.3% unpaved. As a country with much larger urban centres, Mexico has a higher percentage of its roads with four or more lanes, at 3.1% compared to Canada that has 1.8% of roads with four or more lanes.

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[155] Transport Canada

Railways

Canada's railway system is made up of 77,387 kilometers of rails while Mexico has 26,623 kilometers. Both countries have witnessed considerable reform within their rail systems. In Canada, the Canadian National Railway company was privatized; federal transport subsidy programs were terminated; confidential contracts were introduced that permitted enhanced rate and service competition; barriers to the discontinuance of rail lines were lowered; and, short line railways encouraged. In the past two years, the Mexican railway system has undertaken substantial investments in order to improve security, efficiency, competitiveness and modernisation. The three main trunk lines and four short lines, making up 81% of the main railway lines with around 13,500 kilometres of tracks, are operated under concession. Other major stretches of railway in the southeast and north of the country are in the process of being transferred to operation under concession. The Mexico City railway terminal has also been privatised.

In 1997 and 1998, more than U.S.$3 billion was invested in Mexico's rail rolling stock, infrastructure and systems. Over the five following years, more than U.S.$13 billion is slated for investment. Another U.S.$5 billion has been allocated for long-term lease-financing acquisition of hauling and tracking equipment. All of this has had a positive impact on the national railway system, reflected in an increase in the average speed of trains, a shortened response time for clients, increased volume of freight movement, and more extensive and better services.

NAFTA has played an important role in increasing rail movement in both countries. For Mexico, in 1998, the volume of freight moved by rail in Mexico was 76 million tonnes, over 23% more than in 1997 and 46% more than in 1994, a year which marked the reversal of a gradual decline in railway activity. In the case of Canada, demand for rail transport increased 7%.[156] Between 1988-1998, containers on flat cars, petroleum products, motor vehicles and parts and chemical products were the fastest growing commodity group shipped by rail.

Airports

In 1998 Canada had 44 airports with air traffic control towers. Currently, the twenty-six National Air Systems airports are considered most essential to Canada's air transportation system. They service 94% of all scheduled passenger and cargo traffic in Canada. They are the points of origin and destination for almost all inter-provincial and international air service in Canada. In 1998, Mexico had 84 airports – 55 national and 29 international.

Like rail, both countries have been reforming their airport systems. Mexico has continued its efforts to encourage private investment in the modernisation and expansion of its air terminals, while extending concession for the provision of regular, national air transportation services. Thirty-five airports are up for privatisation. In late 1998 and early 1999, 15% of the shares representing the capital stock of the Southeast and Pacific airport groups—with nine and 12 air terminals, respectively—were assigned to private consortiums. In Canada, the federal government retains its role as safety regulator but has moved away from being the sole airport owner and operator to a "landlord" and "lease administrator".[157] Responsibility for the operation, management and development of airports will be transferred under long-term lease agreement to Canadian airport authorities (CAAs). The aim is to enable airports to operate in a more commercial and cost-efficient manner, providing a level of service commensurate with local demands and resources. The setting of fees and charges as well as the regulation of ground transportation services (taxis, limousines) will be placed in the hands of airport operators with the aim of allowing for a faster and more efficient response to local market conditions and development plans.

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[156] Transport Canada, rail statistics.

Mexico remained an active force in bilateral aviation agreements, which encourage reciprocity and a non-discriminatory treatment and thus contribute substantially to creating aviation opportunities among their signatories, which include Canada, the United States, and Italy. New aviation agreements were also recently signed with New Zealand, Belgium and Fiji.

In Mexico, a total of 38,000 metric tons of freight were shipped by air in 1998, 15.8% more than in 1997. For Canada, 814,711 tonnes of cargo were transported by air in 1998. Domestic transport accounts for the largest share of Canadian air cargo transport, at 60% of all enplaned and deplaned cargo in 1998. Transborder shipments accounted for approximately 12% of all enplaned and deplaned cargo in 1998 and 9.5% in 1997.

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[157] Transport Canada "*The National Airport Policy, Policy and Regulations – National Airports System.*"

10. APPENDIX V: GOVERNMENT R&D PROGRAMS IN CANADA AND MEXICO

Apart from tax incentives, the Canadian federal government provides other forms of R&D support. In the 2000 Budget, the government designated funds to support major new R&D investments and initiatives. The funds that may have an indirect impact on the auto sector are as follows:[158]

- The Canada Foundation for Innovation: this foundation was established in 1997 to award funds to post-secondary educational institutions, research hospitals and not-for-profit institutions for state-of-the-art research. It seeks to encourage the private-public partnerships to modernise Canada's R&D infrastructure in universities and research hospitals.[159] Initially the government earmarked $800 million to the Foundation, added $200 million in the 1999 budget and designated a further $900 million in 2000.
- Canada Research Chairs: the 2000 federal budget provided $900 million over five years through the granting councils to establish and sustain 2,000 Canada Research Chairs by 2004-05.
- PRECARN: is a national industry-led consortium that assists Canadian companies in research of artificial intelligence and advanced robotics. The federal budget provided $20 million in 1999-2000 to the program.

In addition, there are a number of industrial development policies in place that apply equally to all industries in Canada, including the automotive sector:

- The Canadian Technology Network: links federal/provincial and private institutions to provide Canadian companies with information about how to meet technology and related business challenges;[160]
- The Industrial Research Assistance Program: provides grants and technical support to small and medium-sized enterprises to help them improve their technological competence, productivity and competitiveness;[161]
- Technology Partnerships Canada: targets companies seeking assistance for the commercial development of enabling and environmental technologies; and,[162]
- The Panel for Energy Research and Development: provides financial assistance to companies doing original R&D in energy-efficient technologies.[163]

In addition to these programs, the federal government has also put in place policy and legislation in place with respect to intellectual property and trade secrecy protection, and provides government grants and contracts for R&D.

The Ontario government has similarly put a number of programs in place. The 2000 Ontario Budget established the Ontario Research Performance Fund to provide over $30 million annually to colleges, universities and research institutes, to cover overhead associated with Ontario-funded research. The Ontario 2000 budget also doubled the R&D Challenge Fund to $100 million. The Challenge Fund is a partnership between five ministries of the Ontario government (Energy, Science and Technology; Training, Colleges and Universities; Economic Development and Trade; Finance; and Agriculture, Food and Rural Affairs) and the Ontario Jobs and Investment Board. Its purpose is a promotion of research excellence by increasing the R&D capacity of Ontario universities and other research institutions through private and public sector partnerships.[164] To enhance training in the R&D area, the Ontario budget earmarked $2 million over three years to undertake training for women in the information technology sector and, similarly, earmarked $1.4 million to expand the successful Ontario Youth Apprenticeship Program to all school boards offering secondary education. To raise youth's awareness of science and technology, the Ontario government allotted $5 million over five years for community and school-based programs.[165]

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[158] Budget 2000, Finance Canada; http://www.fin.gc.ca/budget00/admin/budtope.htm

[159] Industry Canada, June 1998, at 20.

[160] "Section 2: Trade and Industry Policy Environment", APEC Member Economies, www.apecsec.org.sg/committee/auto/canada.html, at 4.

[161] Industry Canada, June 1998, at 20.

[162] Industry Canada, June 1998, at 20.

[163] Industry Canada, June 1998, at 20.

The National Counsel on Science and Technology (CONACYT) is the Mexican institution in charge of fostering and supporting research and development of science and technology in Mexico. Among the programs that it supervises are:

- The Program of Technological Modernization (PMT): The objective of this program is to support small and medium companies by way of their technological modernization.
- The Program of Joint Projects of Research and Development Support (PAIDEC): This program focuses on encouraging companies to access technical knowledge developed at universities through joint industrial research and development projects designed to meet companies' needs.
- The Program of Projects linked with the Support of the Academic Sector (PROVINC): The objective of this program is to increase the capabilities and the interest of universities to meet the demands of the private sector.
- The Technological Modernization Research and Development Program Fund (FIDETEC): This program provides financial support to investment projects which are in pre-commercial status and which include an originating idea and prototype construction; and
- The Technological Consultants Registry (RCCT): This program was created to provide advice technological management assistance and supervision, mainly by way of the Research and Development for Technological Modernization Fund (FIDETEC). However, the program has been increased to provide high quality services to businesses interested in executing technological development projects or solving specific technical problems to increase their competitiveness. The RCCT is composed of consulting firms, researchers, engineers, technicians, managers and other specialists involved in technological transfer, development and quality improvement.

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[164] Ontario Challenge Fund http://www.ontariochallengefund.com

[165] Ontario 2000 Budget Highlights; http://www.gov.on.ca/fin/bud00/research.htm